INFORMATION AS A STRATEGIC RESOURCE CRITICAL TO MILITARY OPERATIONS AND DEFENCE OF THE NATION

Nikolche MILKOVSKI[1]
Mitko BOGDANOSKI[2]

Abstract:*Information today dominates the world, which is constantly changing. Maintaining the status quo in the field of acquisition of information and its timely and correct application in all elements of combat operations, and non-application of information operations concept will inevitably result in stagnation of the state and the armed forces. Any change in this field, due to their impact on the overall effectiveness of national power must be well and carefully assessed before being applied. The experience of recent conflicts, globally, one can easily conclude that the information is one of the most important tools in the hands of the military decision-makers. Therefore this paper gives an overview of the importance of timely possession of accurate information during military operations and defence.*

Keywords: *information, information systems, information superiority, information environment*

Introduction

According to the history of war, the domination over information has always been at the heart of military operations. In today's "information time", the importance of dominance over information and information superiority must be carefully solved. Modern information technology has dramatically changed the way information is collected, stored, analyzed and shared. The speed, accuracy and timeliness of information have generated the creation of the concept of information operations.

It is very important that military and civilian leaders understand the true value of information and information environment and their importance in achieving information superiority in a conflict.

[1]   The author is an officer in the Army of the Republic of Macedonia
[2]   The author is an Associate Professor at the Military Academy "General Mihailo Apostolski" - Skopje, associated member to the State University "Goce Delchev" - Stip

> *Just the right information,*
> *at the right time and for the right customer*
> *is what is valuable!*

Information

Delivery of the right information, at the right time, in the hands of the right people, provides a key advantage for individuals, organizations and nations. There is a constant struggle between acquisition of valuable information about our opponent, while simultaneously protecting the information on our own forces, capabilities and intentions. The information should not be considered only as a strategic phenomenon. It is also important in the planning and execution process of operations on operational and tactical level. Today's way of fighting wars has changed, significantly influenced by the technological revolution in gathering, storing, analyzing and dissemination of data.

What is information - Definition

Information is a strategic resource vital to national security. Military operations today, in order to successfully implement multiple simultaneous and integrated activities, are very intensely dependent on information and information systems.[3]

Information can be described as facts, data or instructions that exist in some sort of medium or form. It can also be defined as a sense that humans assign to the data using the known rules used when they represent data.[4]

Information is a term often used to refer to (show) very different points in the spectrum, starting from raw data ending with knowledge. In its basic sense, information is a result of putting individual observations, feedback data from sensors (receptors) or data items in a context that has a (sense) meaning.[5]
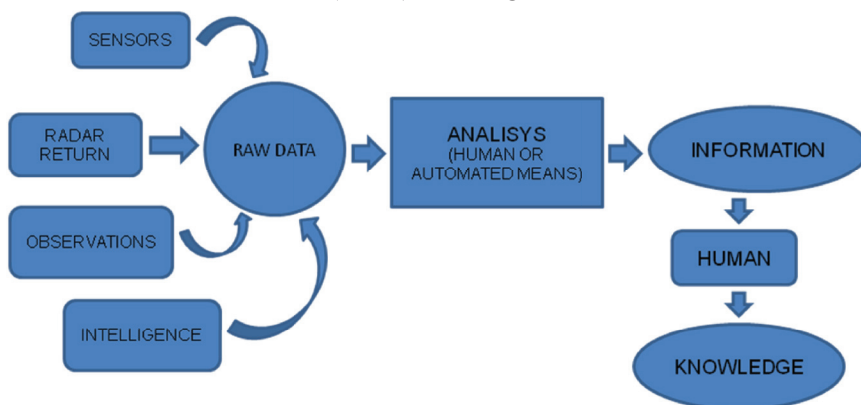

Figure 1 The transformation process - from raw data into knowledge

[3] US Joint Publication 3-13, Information Operations,
[4] Joint Publication 1-02, Department of Defence Dictionary of military and associated terms, 256
[5] Understanding information age warfare, Alberts 2001

Data is a presentation of facts, concepts or instructions in a formalized way. The data should be suitable for communication, interpretation, or processing by humans or automatic means.[6]

Information and knowledge do not necessarily have the same meaning. The available information suggests conclusions formed on the basis of a known pattern and lead to knowledge.

"Knowledge of the situation can be made on the basis of the conclusions that can be drawn from the information on, for example, the types and locations of entities on the battlefield".[7]

Information environment

Information environment is a sum of individuals, organizations and systems that can collect, process, distribute or act on information ".[8]

According to this definition as part of the information environment, besides systems and equipment that manipulate with information, individuals and decision makers are included. People and automated systems observe, orient, decide and act on the information in the information environment. Therefore, the information environment is the main area of decision making.

Although the information environment is considered special, it still exists within each of the four domains: sea, land, air and space.[9]

To understand how information affects the ability to perform military operations, it is necessary to think in three dimensions - physical dimension, information dimension and cognitive dimension. These three dimensions are presented in Figure 2.
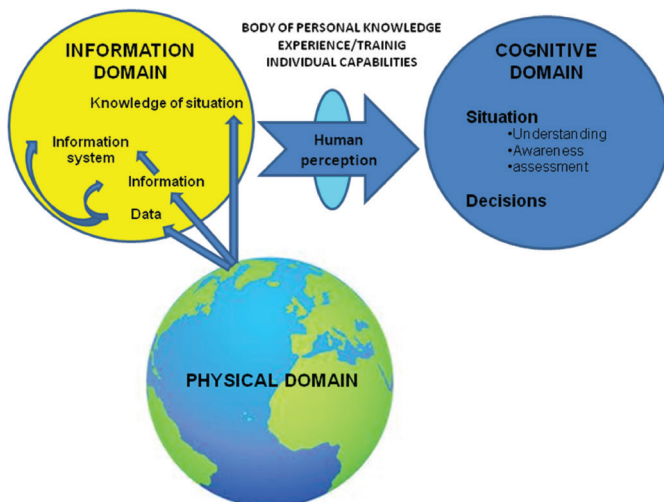

Figure 2. Three dimensions of information environment

---

[6] Joint Publication 1-02, Department of Defence Dictionary of military and associated terms,140
[7] Understanding information age warfare, Alberts 2001,
[8] US Joint Publication 3-13, Information Operations
[9] Ibid

The first dimension is the physical dimension. It may be described or characterized as a general truth or reality.[10] Here belong the existing physical platforms and communication networks. Here exist situations over which the military wants to influence and the actions that are taken in order to achieve influence. Elements in this dimension can be easily quantified and measured.

"In the physical dimension there are command and control systems and infrastructure that enable support of individuals and organizations in air, land, sea and space."[11] As examples of physical dimension we can take people, places and capabilities as geographic coordinates and communications infrastructure.

The second dimension is the information dimension, where there is information and information systems. Here, information is created, manipulated and shared.[12] In this dimension actions such as: collection, storage, disclosure and protection of information are performed. This information may or may not truly represent the "general truth". Information dimension is the place where modern military forces communicate and where commander's intent is conducted. This dimension consists of content and flow of information that must be protected.[13]

The cognitive dimension is the third dimension of the information environment. It is thought of as the most important among the three dimensions because here is where wars are actually won or lost. This dimension is "what happens in our brains". Decisions are taking place (being made) in this dimension.

The cognitive dimension can be described as the minds of the participants where there are perceptions, beliefs, prejudice, quality of education, leadership and morale, and where, by using them, decisions are made. Examples of cognitive dimension are: cultural and social factors, the identity and credibility of key decision makers. Human perception is a "filter" through which the entire content of the cognitive dimension passes. This filter consists of basic personal knowledge that a person brings to a situation, personal experience, training and individual capabilities (intelligence, personal style, ability to perception etc.).

The individuals knowledge (understanding, etc.) are also unique. Since these features vary from person to person, the personal understanding of the world is also affected. Therefore, it is difficult to measure the effectiveness of manipulation of cognitive dimension and to establish a set of standard rules for success in this area.[14]

Today's modern technology makes the manipulation of data in the information and physical dimension easy. The easier it is to store, manipulate and distribute data, the more vulnerable the data become during exploitation. However, the cognitive dimension is still not easily susceptible to exploitation because modern technology

---

[10] Understanding information age warfare, Alberts 2001
[11] US Joint Publication 3-13, Information Operations
[12] Understanding information age warfare, Albert+s 2001
[13] US Joint Publication 3-13, Information Operations
[14] Understanding information age warfare, Alberts 2001

still cannot easily modify the beliefs and prejudice of people. Therefore, the party that can manipulate the cognitive dimension is likely to succeed in obtaining information superiority.

There is one reality or physical dimension. This is converted into selected data, information and knowledge by the systems in the information dimension. With training and shared experience we are trying to develop similar cognitive activities of key military decisions makers, but they still remain unique to each individual.

Information Superiority

Information superiority is essential to achieve almost all joint combat capabilities of today's modern battlefield. By nature it is transient and must be created and maintained by conducting information operations. It provides a competitive advantage only when it is effectively translated into superior knowledge to achieve "decision superiority", actually better decisions, adopted and implemented faster than the opponent can act, or in non-combat situation, decisions taken at a pace that allows forces to shape the situation or react to changes and achieve its mission.[15]

Information superiority is a relative concept. It describes a state of imbalance that exists between two or more parties in the information dimension. Sometimes information superiority is wrongly understood and it is treated simply in terms of information and communication abilities which a party has over another. This conception leads to emphasizing the information process: collection, analysis, distribution and storage. However, information superiority is not all that. Therefore, in order to better conduct information operations and to be able to make better decisions compared to the opponent, it is useful to understand what the meaning of information superiority is.
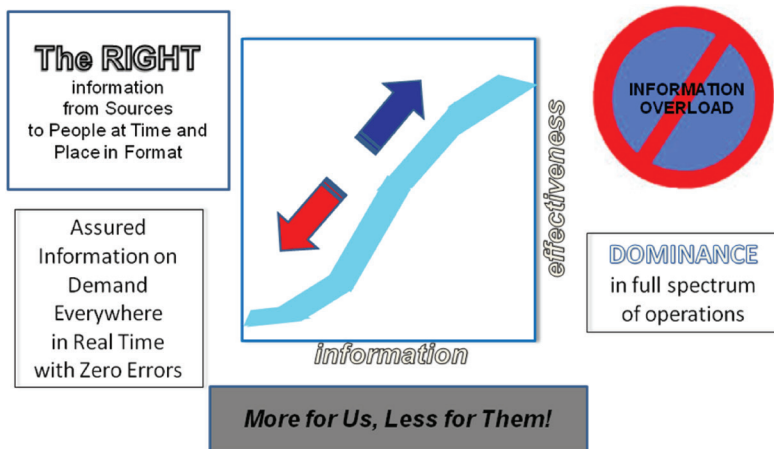

Figure 3. Information superiority

---

[15] Key Concepts for Information Superiority Dr. David S. Albert

The main task of information operations is interpreted as "achieving and maintaining information superiority"[16], which provides a commanding officer with advantage only when converted to superior decisions.

Information superiority is balancing with the situation of a preference for one side in the information dimension.[17] This can be achieved by getting the right information to the right people at the right time and in the right form, at the same time preventing the opponent of doing the same.

Information superiority is a condition achieved through the establishment of the relative advantage of the information that can acquire competitive advantage. Information superiority is a condition that can be achieved or lost over time. This condition should be understood as relative information advantage - it is comparable and transient.

However, the possession of information advantage does not result in information superiority, unless it can be converted into a significant competitive advantage.

Information superiority is not a goal by itself, but a means of achieving the goal. Its existence and meaning depends on its contribution to this goal and the value placed on the goal, which in military conditions would be achievement of military mission.[18]

The military is designed to function and adapt to the lack of necessary information about the opponent or to deal with the so-called "fog of war".[19] This haze applies to all ambiguities related to where the opponent is assigned, which are his abilities and what are his intentions. Until recently, the commanders on the battlefield were not able to have timely and accurate information on the exact location of their units, and even less about where the opponent is and what his intentions are.

Problems appeared during the implementation of plans for synchronization of forces on the field ground in implementation of even the simplest operations. There are several reasons for this. Some of them are due to the so-called "Fog of war", others because of poor communication and some because of not sharing of the information. Because of the high cost of the errors in the implementation of operations, the military is accustomed to be constantly preoccupied with reducing the effects and risks associated with the "fog of war". The removal of this problem and the deviation from the way in which the military is accustomed to function for centuries requires a valid and strong evidence that the "new" way of thinking and functioning is better, but at the same time robust.

Technological developments we are witnessing today provide an opportunity of reducing the influence of "the fog of war." However, it must be clear that no matter how big the technological advances are, they cannot completely eliminate this phenomenon

---

[16] US Joint Publication 3-13,Information Operations
[17] Joint vision 2020, General Henry H. Shalton, Chairman of the Joint Chiefs of Staff, Director for strategic plans and policy, J5; Strategy Division, US. Government printing office, Washington DC, June 2000
[18] Key Concepts for Information Superiority Dr. David S. Albert
[19] Ibid

and the "fog" will continue to exist in some capacity and will persist. Military leaders today need to be aware of this and should find a way to cope with what will continue to exist and persist.

Figure 4 presents the interrelation of the efficiency depending on the extent of the presence of ambiguities that are a consequence of "the fog of war." Military organizations have always fought to avoid the worst of the area represented on the image (bottom right end tinged with red).
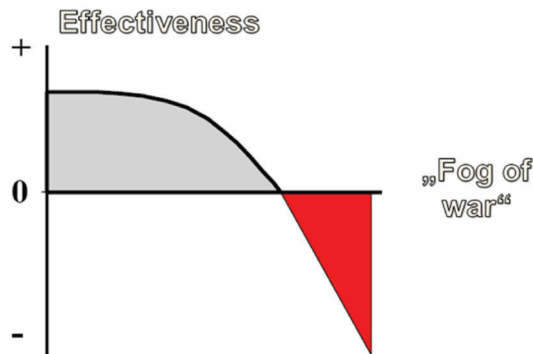
Figure 4. Information superiority - greater efficiency

Today's technological advances provides the military with the means to easily find the "gray area" of the image where the operations will be conducted with high efficiency in terms of reduced extent of the presence of "the fog of war." As mentioned before, the military leaders must be aware that the "fog" cannot be fully supplanted and that to a certain extent it will constantly be present and it will continually affect the efficiency with which operations are conducted. Therefore, it is important not only to know how to provide information superiority, but also how to better deal with ambiguities that will certainly exist.

It is important to plan the information capabilities of the organization relative to its needs. The concept of operations, organizational forms, access to command and control, doctrine, tactics, techniques and procedures, the rules of war, the level of education and training and the characteristics of armed systems determine information needs of countries in the war.

The ability of a party in a war to successfully conduct operation largely depends on the extent to which these information needs are met. Information needs of the warring parties differ significantly.[20]

Pursuit to gain information superiority is not a new concept and leaders always tried to do so, and those who have acquired this advantage had considerable success

---

[20] Key Concepts for Information Superiority Dr. David S. Albert

against the enemy. Sun Tzu Wu was a profound military thinker who was able to highlight some of the most important foundations of gaining information supremacy over an opponent, now called information superiority. Throughout history, the ability to accomplish the mission was designed to minimize the amount of required information and communications, since capabilities in these areas in the past have been very limited. In today's times of asymmetric threats it is likely to face an opponent whose needs in terms of information are different from ours. What matters in this case is: which party would better meet their needs for information, and not which side has better information capabilities.

However, minimization of information capabilities is not a strategy that will result in success. The key to success is finding the right balance in which information capabilities correspond with the concept of operations, organization, access to command and control and capabilities of the people and the armed systems.

The measures used to identify and measure information superiority must be applicable at all levels of war and applicable to every military mission or task. They should be developed to a level of abstraction that will make them stable across a wide range of subjects.

Information can be considered independent from technology, but it must be remembered that the acquisition, processing and dissemination of information today has become very dependent on technology. Because of this, technology has a great contribution to information superiority, if it can be used properly.[21]

Commercial achievements and progress of information technology nowadays have become equally available for both friends and enemies. Bearing this in mind, it is essential for the armed forces to ensure that all military systems have enough open architecture to facilitate the addition of the latest and most effective technologies when they are available, with the ability to just put them in the system immediately to use or the so-called "plug-and-play" feature.

Information and its importance for the military

Information has always been critical item for military operations. Military personnel must understand the vitality of information and act accordingly. It is useful to understand the reasons why information is essential for the military.

"Know thy enemy and know yourself, in a hundred battles you will never know the danger. When you are ignorant to the enemy but know yourself, your chances of winning and losing are equal. If you do not know the enemy and yourself, then it is certain that in every battle you are in danger."[22]

The term "full spectrum dominance" implies that "armed forces are able to conduct rapid, sustained and synchronized operations with forces dimensioned for

---

[21] Cornerstones on information warfare, Ronald R. Fogleman and Sheil E. Widnall 1995
[22] The art of War, Sun Tzu Wu,

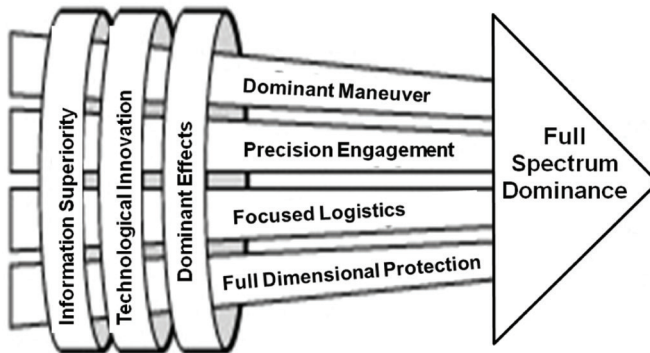specific situations and with access to and freedom to operate in all dimensions - land, sea, air, space and information".[23]

Figure 5. Creation of a full spectrum dominance

As shown in the foregoing, the list of dimensions where military operations are conducted has been extended with the information dimension, knowing the present state of war, it is not surprising. But the question is how much information occupies a central place in the military world? The manual "Information Operations: doctrine, tactics, techniques and procedures" of the US Army, from November 2003, in the opening sentence clearly highlights:"**The information is an element of the combat power**".[24]
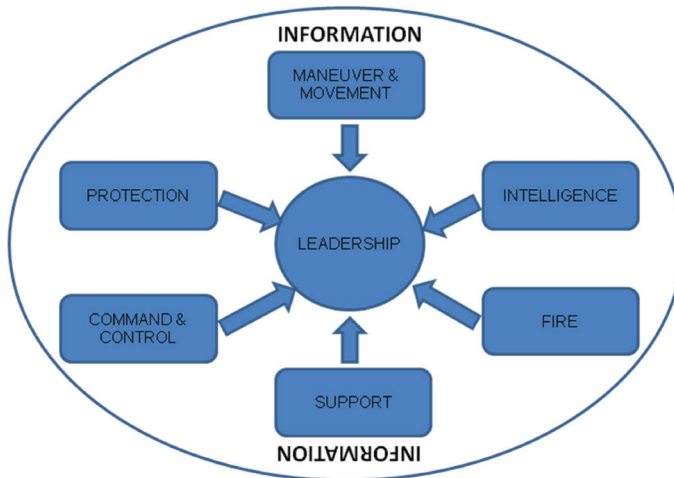

Figure 6.Elements of the combat power [25]

[23] Joint vision 2020, General Henry H. Shalton, Chairman of the Joint Chiefs of Staff, Director for strategic plans and policy, J5; Strategy Division, US. Government printing office, Washington DC, June 2000

[24] Headquarters, Department of the Army, FM 3-13 (FM 100-6), Information Operations: Doctrine, Tactics, Techniques, and Procedures, November 2003

[25] FM 3-0. Operations, Headquarters, Department of the Army (2008), February

Due to its complicated nature, there is always some uncertainty in the military environment. In order to overcome this uncertainty, military leaders at all levels must gain information about the enemy and the battlefield. Decision makers can make accurate decisions only when they have timely and accurate information.

The dimensions of information are: relevance, accuracy and timeliness. The upper limit of the information dimension is achieved when the identification of information and removal of the most important goals are achieved every time. The biggest challenge lies in the transient targets, those that are movable and whose value is variable over time.

Even nowadays it is difficult to determine the exact action. Modern advances in technology today allow the commander to better handle information, to understand, analyze and act on what is happening on the battlefield. But there will always be a significant level of uncertainty that will exist in the handling of information. Uncertainty can occur due to flaws and imperfections of sensors that collect information, differences in human perception of the reproduced information and etc. Therefore, the party that makes the least mistakes in handling the information is likely to prevail because it will make (adopt) better and healthier decisions. Today's technology has increased the complexity of collection, processing and dissemination of information. All this will undoubtedly change the way wars are fought and the role it will play in the transformation of the techniques of warfare and the transformation of the structure of units. Therefore it is necessary to constantly review and reassess the organizational structure, doctrine and concept of warfare, new technology and training staff. In order to effectively implement this task on the battlefield, it is necessary to understand the value and importance of information.

Information is a strategic resource that is critical to military operations and security of the nation. The complexity of the battlefield of today makes military operations highly dependent on information and information systems in the processes of integration, coordination and taking actions.

Major challenge for military leaders today is the fact that the instruments of information operations nowadays can be used by the opponent and can cause a significant negative impact on the military environment, because nowadays they are easily available almost anywhere in the world.[26] They are cheap, commercial (COTS - commercial-off-the-shelf), easy to set and maintain and do not require a high degree of expert knowledge to use them.

Information is important in the planning process of military operations. Holders of military decisions should understand the importance of information operations because the desired effect of information operations is not always to fight and destroy the enemy. A thorough understanding of the importance of information will enable the commander to visualize the opponent capabilities for information operations and to take the necessary precautions to prevent compromise of friendly information by

---

[26] US Joint Publication 3-13, Information Operations

the opponent. The constantly changing nature of the combat zone actually adds more complexity to the process of information processing and thus makes it even more difficult the understanding of information.[27]

Information and its quality

The quality of information is very important. The quality of information is a job that is very difficult, and in some cases almost impossible, to quantify. Figure 7 shows the quality criteria for information.

INFORMATION QUALITY CRITERIA
ACCURACY Information that conveys the true solution
RELEVANCE Information that applies to the mission, task or solution at hand
TIMELINESS Information that is available on time to make decisions
USABILITY Information that is in common, easily understood format and displays
COMPLETENESS Information that provides the decision maker with all necessary data
BREVITY Information that has only the level of detail required
SECURITY Information that has been afforded adequate protection where required

Figure 7. Criteria for quality of information

Different goals for the use of information require different application of these criteria, and different measurement of each criterion.[28]

The most important thing is to get the right information at the right time, in the hands of those who need it. As there are no tools to measure the quality of the information before it is received, the quality is often subjective. The quality of information varies by cognitive dimension of the individual, his prejudice, education, training, morale and experience.

Information operations are very different from direction in conventional warfare and kinetic weapons, where the measurement of the efficiency of the tool is easier using physical measures.

---

[27] US Joint Publication 3-13, Information Operations
[28] US Joint Publication 3-13, Information Operations

Conclusion

Lesson learned from recent conflicts, starting with the Gulf War, ending with current operations in Afghanistan and NATO operations in Libya, is that what can be seen - can be hit, and what can be hit – can be killed. The function of "seeing" is now much more sophisticated and includes electronic, optical or acoustic sensors that may have even global coverage. These sensors can be connected in real time with computer-controlled weapons systems with exceptional accuracy and killing power. Prerequisite for successful implementation of all this is information.

Gaining dominance over information and superiority in decision-making is crucial to all military activities. Understanding the interconnections and relationships between the capabilities of information operations is critical for the success and achievement of the ultimate goal.

Today, due to the massive use of information technologies in military operations the possibility of exploitation of the flaws and weaknesses in these technologies in hostile activities to disable the information systems and reduction or loss of information superiority is increased.

REFERENCES

1. Cornerstones on information warfare, Ronald R. Fogleman and Sheil E. Widnall, 1995, http://www.iwar.org.uk/iwar/resources/usaf/iw/corner.html

2. U.S. Army Field Manual FM 3-0. Operations, Headquarters, Department of the Army, February 2008, http://www.bits.de/NRANEU/others/amd-us-archive/fm3-0(08).pdf

3. U.S. Army Field Manual FM 3-13(FM 100-6) Information Operations: Doctrine, Tactics, Techniques, and Procedures, Headquarters, Department of the Army, November 2003, http://fas.org/irp/doddir/army/fm3-13-2003.pdf

4. US Joint Publication 1-02, Department of defence dictionary of military and associated terms, November 2010, As Amended Through 15 January 2015, http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf

5. US Joint Publication 3-13, Information Operations, November 2012, Incorporating Change 1 20 November 2014, http://www.dtic.mil/doctrine/new_pubs/jp3_13.pdf

6. Understanding information age warfare, David Alberts, 2001, http://www.dodccrp.org/files/Alberts_UIAW.pdf

7. Key concepts for information superiority, David Alberts, Paper presented at the Research and Technology Organization Information Systems Technology Panel Symposium, May 2001, Quebec, Canada.

8. Joint vision 2020, General Henry H. Shalton, Chairman of the Joint Chiefs of Staff, Director for strategic plans and policy, J5; Strategy Division, US. Government printing office, Washington DC, June 2000

9. Вештина на војувањето, Сун Цу Ву