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CHAPTER 7

Digital Defense: Goals, Missions, Achievements

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It is an old adage that information dominates the battlefield. Some twenty-five hundred years ago, Sun-Tzu taught us that if you knew the enemy and yourself, you would never be in danger in hundreds of battles. Sun-Tzu's words, "Know your enemy," mean knowing the enemy leader's intentions. Sun-Tzu thought that if we knew the enemy's intentions, we could win a victory without war against the enemy. However, it is very difficult to find out the enemy's intentions because the enemy publicly never reveals its intentions. Sun-Tzu taught us that it was very important to employ spies. Thus, he developed the use of spies in various ways. In contrast, Clausewitz did not agree with Sun-Tzu's idea on the importance of employing spies. He thought that it was very difficult to get information from spies in the battlefield and very risky to believe the information from the spies. Therefore, Clausewitz insisted that destroying the enemy by mobilizing the strong military power was far better than relying on information from spies.

The evolution of modern technology fundamentally changed the battlefield environment. Advanced sensor

technology made it possible to discern the enemy's location and activities day and night. Advanced computer technology made it possible to produce accurate information quickly from a vast amount of information data. Yet, it is still a very difficult job to discern the enemy leader's intention, despite the fact that our capability of assessing the enemy's weapons and combat tools is significantly improved. Development of networking technologies made it possible to disseminate battlefield information easily to the required user. The supreme command and the combatant unit commanders on the front lines can share the same information. Various functional units can carry out cooperative operations under a unified command and control system. Moreover, advanced precision-guided munitions employing precision-guided technologies are developed to strike enemy targets in depth. The battlefield environment is fundamentally changed by those three advanced technologies – the IT revolution, remote sensor technology, and the PGM technology. These factors influence all military areas, including the weapons systems, strategy, tactics, organizations, and defense management.

Almost all countries are engaged in active transformation of their militaries by adopting the radical changes induced by the information technology revolution. All nations that watched closely the Gulf War realized the fact that the military that refused to embrace the IT revolution could not compete against a military thoroughly acclimated to the IT revolution. Generals desire to quickly obtain advanced sensors, information equipment, computerized command and control systems, and precision-guided munitions. However, the military digitization cannot be accomplished over night. Generally speaking, although a developing country may have the budget to purchase sufficient IT hardware, it is not easy to establish the adequate digitized

defense systems without the proper software. Therefore, reasonable goals and priorities are recommended to pursue defense digitization and in a step-by-step fashion.

The goal of defense digitization of the ROK's armed forces is a very ambitious one. The ROK armed forces have set three goals for defense digitization: a) real time visualization of battlefield; b) digital command and control; and c) sensor-to-shooter systems. If we achieve these three goals successfully, commanders can execute real-time command and control with a high degree of visualized battlefield awareness. And, they will be able to build a strike system against high-priority targets as soon as their sensors detect them. But, one needs more than strong desire and political will to achieve these ambitious goals. The country will have to develop a digitized defense infrastructure and proper software for data processing to acquire, process, and distribute of the information.

In fact, the ROK military has concentrated its utmost efforts on the construction of a digitized defense infrastructure. The ROK military's first task is to improve its mobile telecommunication system for tactical units in the field. The core of this project is centered on the efforts to change the existing tree-type communication system into a grid-type system and to improve voice communication and data transfer to enable them to operate simultaneously. When this project is completed successfully, all the tactical units of the ROK armed forces will be linked in a unified digital network and the digitized defense infrastructure will be accomplished.

While generals expect an unlimited capacity of digital communication network, in practice, the data flow capacity must be limited under tactical circumstances. From the standpoint of the Ministry of National Defense, it is

desirable to cultivate powerful software rather than constructing a deluxe hardware system. As limited budget resources and legal constraints on technology transfers from developed countries place limitations on the introduction and continuous upgrades of advanced hardware systems, superior software development is more and more important.

The second task of the ROK military is to secure a high degree of interoperability between the U.S. Forces in Korea and the ROK armed forces. The two allies have done much combined training and many exercises over the past five decades. Thus, both sides are well aware of the most effective ways to exchange information.

Both sides rely on separate and independent communication systems, but they also developed technologies to share information for mutual benefit whenever necessary. The most frequently used methodology is to exchange a liaison officer to communicate through written papers or voice messages. However, a real-time information system is needed to carry out combined exercises successfully in the era of digital warfare. In general, it will not be easy to use the same hardware, but it should not be difficult to develop a system that links the two systems in software dimension.

The command and control system is a good example. The ROK armed forces have been pursuing a digitized command and control system from a top-down approach. Initially, the Joint Chiefs of Staff command post was digitized. Now, the ROK Army is in the process of digitizing the field army's command and control system. The basic system requirement is to adopt an independent command and control system appropriate for the ROK armed forces and, at the same time, to develop an

interoperable software with the U.S. Forces in Korea in order to conduct combined exercises.

In future wars, it is a very important goal to link tactical communication systems, battle space information, and command and control systems effectively for successful combined operations. In order to develop a more effective interoperable network system, it is an essential task to a conduct joint research study between the U.S. military and the ROK military and concentrate efforts in this area of future cooperation.

The third task of the ROK armed forces is to use more widely available commercial communication systems. In the past, mobile communication systems were a military-only tool for communication. But, these days, the technology of commercial telecommunication systems has overtaken the military systems. The ROK military is at best constructing the basis of a mobile data communication infrastructure, whereas the commercial sector has already constructed the IMT-2000 system and is using it for the transmission of live, dynamic messages between users.

Of course, there are many problems that need to be resolved in order to adapt commercial communication systems for military use. Although civilian equipment is compact and convenient to use, its coverage ranges are too limited for field use, and it is difficult to expand the range due to fixed relay posts. Weak security systems also handicap civilian equipment. But, notwithstanding obvious weak points of commercial communication systems, they should not be disregarded completely when constructing an independent military communication system. It is worth seriously considering the use of commercial communication system for military purpose.

The fourth task facing the ROK defense digitization drive is to digitize the administration support system. The ROK armed forces developed the computer aided logistic system separately by functional units. The digitization of munitions and logistics has already been completed, and the digitization of the maintenance service system is now in progress. Compared to other areas, the logistics area will benefit the most from digitization, because it routinely deals with more than six hundred thousand items. When the CALS is completed, service time will decrease, the operation rate will significantly increase, and the number of warehouses will considerably decrease.

However, the ROK's logistics support system develops on the basis of a peacetime communication capability to exchange a lot of data. In wartime, mechanized armor units' data communication will be limited due to the system's insufficient data flow capacity. As a result, it may cause problems for the digitized CALS system if they are used simultaneously. In order to alleviate this under-capacity concern, the ROK armed forces should enlarge mobile communication capacity or reduce the amount of logistics data. This is an important task facing the ROK armed forces.

The fifth task facing the ROK armed forces is preparation for information warfare. One can say that the digitization level of the ROK armed forces is still on the ground, meaning that the ROK armed forces cannot be considered as capable of protecting their satellites in space. One of their major concerns is to protect their information systems physically from external attackers and to protect their cyber assets, including information, from external invaders and/or hackers. The ROK armed forces need both to protect their ground communication system nodes and to develop counter-measures for denying electronic invasions by

external hackers.   As the ROK's defense information system is still at its nascent development stage, it is not a difficult job to protect the system, because the scope of the system is limited, which simplifies access control. However, digital defense becomes more difficult to safeguard as the scope of digitization gradually expands.

In the information age, the IT revolution gap between advanced and underdeveloped countries will become larger and larger. With time, it may become almost impossible for underdeveloped countries to catch up technologically with advanced countries. Accordingly, the options that underdeveloped countries can choose from must include an asymmetric warfare strategy. Computer hacking could be one possible option for the underdeveloped countries. Therefore, it will be very useful to launch a joint ROK-U.S. research study aimed at developing additional security measures for the protection of data and key national information infrastructures.

The ROK's armed forces are still in the early stages of establishing the foundation for national defense digitization aimed at achieving its ultimate goals of real-time visualization of the battlefield, introduction of digital command and control, and adaptation of sensor-to-shooter systems.   Building a solid foundation for defense digitization is important. For without a solid and proper foundation laid in the very beginning, it will be very hard to build an inter-operable information system among the services in the future. Moreover, without establishing a firm foundation for the interoperability between the ROK armed services, it will be almost impossible to develop the interoperability of the combined forces between the ROK and the United States.

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