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Assessment of Combined Tactical Air Operations

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Abstract: This study describes assessment of tactical air operations for US-ROK Combined Forces Command and procedures for the planning, synchronization and execution of tactical operations in the Korean theater by the armed forces of the ROK-US combined forces command. Procedures for the integration of theater air-ground system is also studied. We study the Marine Air Command and Control System's (MACCS's) principal airspace control and management agency and the Marine Air Control Group's (MACG's) Marine Air Control Squadron (MACS) and Korean Tactical Air Control System (KTACS) for combined tactical air operations. We found the Combat Support System (CSS) hardware included a Perkin Elmer 3230 mainframe processor at the HTACC facility. And 8 work stations of Korean Air Intelligence System (KAIS) can be connected to an IBM 3299 terminal multiplexer that in turn interfaces with the IBM 3174 terminal controller. The ROKAF ADP (Automated Data Processing) for tactical air operations is associated with the High and Medium Altitude Air Defense System (HIMADS) HAWK brigades and battalions and the four TSQ-73s at the brigade level are directly connected to the MCRC ADP system over TADIL B links. And also the CONSTANT WATCH Korean Combat Support System (KCSS) incorporates an automated capability to assist in the preparation of Air Tasking Orders (ATOs). The capability of CONSTANT WATCH KCSS for tactical air operations is not in use because of the difficulties involved in its application. Instead, PC Frag has been used to prepare the ATOs and the various existing and future versions software should be carefully examined to select the most suitable software tool that is to be used by all involved.

Key words: ACC, command and control, ADP, MCRC, capability, terminal controller

INTRODUCTION

From the start of Korean War, the deployed tactical fighters and bombers to Japan and South Korea were effective. On 10 July, 1950 a North Korean armored column was trapped at a bombed-out bridge near Pyongtaek in Korea Peninsula, F-80 Shooting Stars, B-26 Invaders and F-82 Twin Mustangs destroyed 117 trucks, 38 tanks and seven half-tracks. The North Koreans pose a powerful threat to the South and have the capability to mount a major offensive against the ROK without direct assistance from the Chinese or Soviets. North Korea's ground forces are composed of over 865,000 active duty troops. It is believed that these ground forces constitute the greatest threat to the ROK. Although, North Korea has only 1-10th the population of the US its army is approximately the same size as the US Army. North Korea's ground forces are divided into as many as 25 corps-level authorities. Organized along functional lines, these corps include eight conventional corps four mechanized corps an armored corps and an artillery corps. The conventional corps located nearest to the DMZ provide forces for the echelon of fighting units. The T-62M is the most capable tank in the North Korean inventory and the only tank comparable to the ROK's best, M48A5K tanks (Kalman, 2017). North Korea began to develop the SCUD-B, surface-to-surface missile and has been concentrating on developing a viable nuclear deterrent. North Korea is now developing a Submarine Launched Ballistic Missile (SLBM) and a submarine that can launch such a missile while submerged. Republic of Korea Army (ROKA) combat air command is under the Air Component Command (ACC) which is part of the air component of US-ROK Combined Forces Command (CFC) and is commanded by the CINC (Commander in Chief) CFC (Suh, 2007). The CFC is the warfighting head-quarters and these CFC forces are organized into ground, air and naval components including two major subordinate commands and marine in Korea. The role of the CFC is to deter or defeat if necessary, outside aggression against the ROK. To accomplish that mission, the CFC has operational control over more than 600,000 active-duty military personnel of all services of both ROK and US forces in Korea. If North Korea attacked, augmentation could include some 3.5 million ROK reservists as well as additional US forces deployed and

the CFC would provide a coordinated defense through its air, ground, naval and combined marine forces component commands. The mission of the 7th Air Force (7AF) is to plan, direct and conduct combined air operations in the ROK and in the Northwest Pacific in support of PACAF (Pacific Air Force) and US-ROK Combined Forces Command (Banton, 2011). The 7AF was reactivated at Osan Air Base, South Korea to replace the 314th Air Division after 1996. Enemies today are deterred by CFC team that evolved from the multi-national United Nations Command (UNC).

MATERIALS AND METHODS

Tactical Air Operations: Automated Command and Control (C^2) information management and data processing systems for combined tactical air operations fall into four groups. Consideration must be given to each user group, the automated support within each group and the interoperability within and among systems supporting the groups: The combined Korean tactical air control systems, ROK automated support, US in-country auto-mated support and potential US reinforcement systems. Table 1 summarizes the principal ADP (Automated Data Processing) systems.

The Tactical Air Operations Center (TAOC) is the Marine Air Command and Control System's (MACCS's) principal airspace control and management agency. The Marine Air Control Group's (MACG's) Marine Air Control Squadron (MACS) provides personnel and equipment. Through radar inputs from its organic sensors and data link information from other Military Radar Units (MRUs), the TAOC provides real-time surveillance of assigned airspace in addition to air direction, positive aircraft control and navigational assistance to friendly aircraft. The TAOC provides air surveillance and control of aircraft and Surface-to-Air Weapons (SAWs) for Anti-Air Warfare (AAW) in support of the Marine Air-Ground Task Force (MAGTF). Its primary function, to conduct and coordinate AAW is accomplished through the direction, coordination and employment of various air defense weapons systems that include interceptor aircraft and Ground-Based Air Defense (GBAD) weapons (Lotter *et al*., 2013). Improvements implemented during the early to mid-1990s have significantly enhanced the capabilities of Korean Tactical Air Control System (KTACS) which is used to plan, coordinate and direct air operations throughout Korean theater of operation. For air defense operations, the establishment of the Master Control Reporting Center (MCRC) operational facility, the installation of the MCRC Automatic Data Processing (ADP) system and its direct netting with the KTACS ground-based radars and the USAF Message Processing Center (MPC) have enabled the MCRC to receive and process track data through manual intervention. The resultant air pictures are real-time and comprehensive compared to the slow and at times incomplete air pictures produced with the previously manual procedures. The installation of the large number of control display consoles in the MCRC and the availability of the real time air picture to the controllers have vastly improved both the ability and capacity of the controllers and the KTACS as a whole in performing such tasks as warning, weapons assignment, intercept control and airspace management (Miller, 2002). For offensive air operations, the constant watch kcss (Korean combat support system) supports information management at Hardened Tactical Air Control Center (HTACC) (Park, 2016). The system's electronic interfaces with the various ROK and US organizations and units external to the HTACC such as Wing Operations Centers (WOCs) and Air Support Operations Centers (ASOCs) through remote sub-hosts and terminals have considerably shortened the time required the dissemination of Air Tasking Orders (ATOs) which is a means by which the Joint Forces Air Component Commander (JFACC) controls air forces within a joint operations environment (Conner and Lambertson, 2005).

Table 1: Potential system-level interface needs of amphibious operations

			Current interface		
Node A	Node B	Principal ADP interface	Level	Status	Future level
Between USMC and Combined organizations					
MAGTF COC	CFC	TCO-TACCIMS	N/A	N/A	2
MAGTF COC	NCC	TCO-TACCIMS	3	N/A	2
MC TACC	MCRC	TAOM-MCRC ADP	3	E	3
Between USMC and ROK organizations					
MAGTF COC	ROK Div. TOC	TCO-ROK MC	N/A	N/A	2
MC TACC	ROK Div. TOC	ATACC-ROK MC	N/A	N/A	2
MC Maneuver Ech.	MC Maneuver Ech.	MC MC-ROK MC	N/A	N/A	2
MC FSCC	ROK FSCC	MC FS-ROK FS	N/A	N/A	3

MAGTF: Marine Air Ground Task Force; COC: Combat Operations Center; TCO: Tactical Control Operations; TACC: Tactical Air Control Center; FSCC: Fire Support Coordination Center; N/A: one of the systems is currently unavailable; TAOM: Tactical Air Operations Module; ATACC: Advanced Tactical Air Command Center; TACCIMS: Theater Army Command and Control Information Management System; MC: Marine Corp

Combined ADP systems air operations: ADP systems enhance the combined tactical air operations capability (Park, 2016). In order to enhance the combined tactical air operations capability existing ADP systems are now upgraded. The recent improvements can be categorized into three general phases.

Phase 1: A principal accomplishment of this phase is ROKAFs construction Hardened TACC (HTACC) facility at Osan Airbase in Korea. The facility was completed in January 2001 and initially housed the various ACC (Air Component Command) staff elements including the combat plans division, combat operations division, combat operations intelligence division and a consolidated communications center. The USAF installed a baseline Korean Air Intelligence System (KAIS) to support the management of intelligence information including air, SAM (Surface-to-Air Missile) and electronic orders of battle of the North Korean military.

Phase 2: This phase encompassed both ROKAF and PACAF (Pacific Air Force) initiatives under project 222, ROKAF established a Master Control and Reporting Center (MCRC) in the HTACC (Hardened Tactical Air Control Center) facility as the focal point of the Korean Tactical Air Control System (KTACS) in tactical air surveillance and control (Miller, 2002). Three Hughes 5118 ME central processors, a large number of control consoles and a large-screen electronic display were installed in the MCRC PACAF, under the Constant Watch (CW) program, acquired UHF radios for ground-air-ground communications between the MCRC and airborne aircraft. The MCRC ADP system integrates radar input from multiple ground-based and airborne air surveillance systems and performs real-time automatic track correlation to provide a comprehensive air picture. The 18 KTACS radars supporting the ROK CRCs (Control and Reporting Centers) and CRPs (Control and Reporting Posts) were directly connected to the MCRC system via. data links. In addition, air surveillance data to and from the four ROK SAM brigade's Missile Minder system (AN/TSQ-73) can be directly transferred over Tactical Digital Interface Link B (TADIL B) links. Air surveillance data from the various US. systems such as E-3, E-20 and Navy NTDS/ATDS (Air Tactical Data System) can be exchanged with the MCRC through the USAF Message Processing Center (MPC). The air picture is displayed on the various local and remote display and consoles at the MCRC, TACC (Tactical Air Control Center) and the Combat Intelligence Division in the HTACC facility as well as the ROKAF and ROK capitol air defense system. The MPC is needed because it translates the TADIL A message format used by many of the US systems to the TADIL B message format (Ryan and Frater, 2002; Sorroche, 2006).

Phase 3: The principal element of this phase was the installation of the Combat Support System (CSS) to enhance capabilities for tactical air operations planning and force management. The CSS hardware included a Perkin Elmer 3230 mainframe processor at the HTACC facility. Figure 1 the CSS, operating at SECRET ROKUS level, supported the maintenance of information files or databases including operations plans, orders and status of friendly forces. To support coordination with tactical

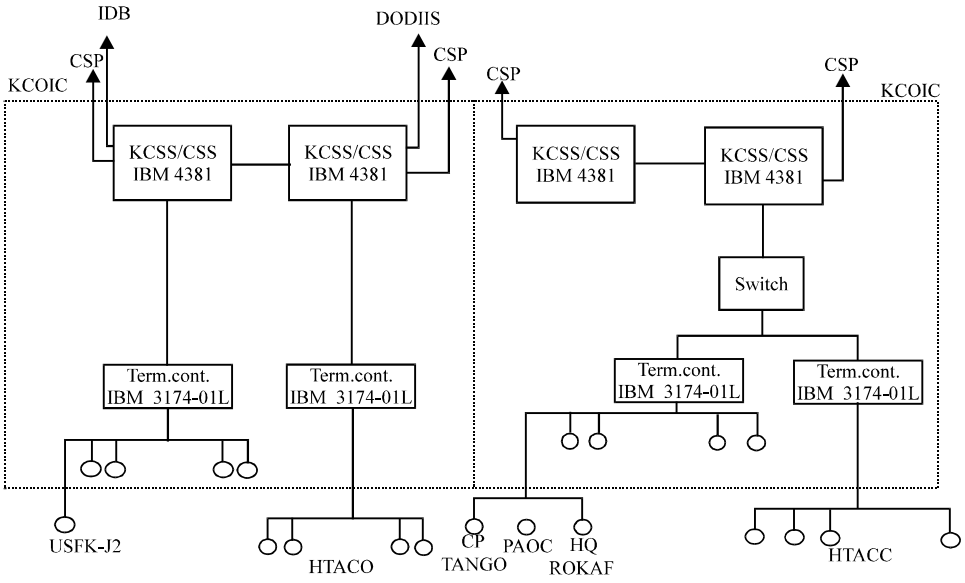

Fig. 1: Conceptual constant watch/OIA conversion

units, CSS remote terminals were installed at various ROK and US airbases, certain ASOCs (Air Support Operations Centers) and other selected command organizations. The ATOs were disseminated to the remote sites through the mainframe-to-terminal connections. Initial conversion from CW to Operations and Intelligence Automation (OIA) was reached in February 1998. Figure 1 represents conceptual illustrations of the conversion system configuration. CSP: Communications Support Processor; DOIIS: Department of Defense Intelligence Information Systems CSS: Combat support System; IDB: Intelligent Database INP: Intelligent Processing subsystem; KAIS: Korean air intelligence system.

Some of the OIA conversion improvements have already been fielded while some others might not have yet been fully implemented. The OIA concept called for the following hardware improvements for the OIA conversion system:

Mainframe processor upgrade: Four IBM host processors have been installed in the Korean Combat Operations Intelligence Center (KCOIC) two each for KAIS and KCSS. The KCSS superseded the CSS system previously located in the HTACC facility. The dual processor configuration provides for continued operation should one of the mainframe computers fail.

Workstations upgrade: IBM 3270 PC/AT workstations would provide users with on-line access to the KAIS intelligence processing subsystem or the KCSS databases and applications software. Each workstation would be connected to a low speed parallel printer. Up to 8 workstations can be connected to an IBM 3299 terminal multiplexer that in turn interfaces with the IBM 3174 terminal controller.

Communications processors: The mainframe computers would interface with PDP 11/84 Communications Support Processors (CSPs) through a communications interface device called AUSCOM 8911A. One AUSCOM would be dedicated to each channel of IBM-to-PDP connection; each AUSCOM supporting a 1.2 Mbps data stream.

Front End Processors (FEPs): The CW PDP 11M0 FEPs were upgraded to a 3-PDP 11/84 configuration. Software and applications improvements for the OIA conversion system as envisioned in the concept include.

Database improvement: Operations/intelligence information ranging from resource and status data to the North Korean air, Surface-to-Air Missile (SAM) and electronic orders of battle information is provided through the KCSS. Planners at the wing level and the ASOCs may access this information using the terminal to mainframe communications connectivity previously installed for the CW CSS.

ATO dissemination: With increased throughput of the KCSS FEP, ATOs generated separately using a PC-based applications software called "PC FRAG" are currently disseminated to the wings and ASOCs very quickly over the communications connections between the HTACC/KCOIC facilities and the remote sites.

Communications connectivity to AUTODIN: The OIA conversion system would allow a direct connection of the KCSS to the US Automatic Digital Information Network (AUTODIN). A Host Message Interface (HMI) capability would allow the IBM mainframe to interoperate with the AUTODIN protocol and a Message Security Filter (MSF) would provide positive control of appropriate traffic on the AUTODIN to the KCSS.

Rokaf information processing support: The other ROKAF ADP capability is associated with the High and Medium Altitude Air Defense System (HIMADS) HAWK brigades and battalions. The Missile Minder system (TSQ-73) at these units assists in the management of the air tracks from their organic radars including track correlation, air picture coordination, etc. The four TSQ-73s at the brigade level are directly connected to the MCRC ADP system over TADIL B links.

US in-country ADP systems: A Worldwide Military command and Control System (WWMCCS) Information System remote terminal (WIS CUS terminal) is located in the HTACC. It is used by the 7AF staffs primarily for reporting information such as force status to the higher US commands. Up to four Korean Intelligence Support System (KISS) terminals are operating in HTACC and KCOIC. A TACCIMS workstation will also be available by Initial Operational Capability (IOC) at the Battlefield Control Element (BCE). These terminals will allow the exchange of information within the respective systems. An automated message format translation capability is also available from a USAF Message Processing Center (MPC) collocated with the HTACC. The MPC is capable of accepting air track data from the reinforcement US air surveillance systems such as the Air Force E-3A, Navy E-2C, Army SAM brigade systems and Marine TAOC systems. The MPC can receive the data input via. TADIL A or TADIL B. It can also support the integration of air track data from the different surveillance systems. The air track information from the MPC is then passed to

the MCRC via. a TADIL B port on the MCRC. An Adaptive Surface Interface Terminal (ASIT) also operates outside of the HTACC, providing interface between the Joint Tactical Information Distribution System (JTIDS) Class 1 terminal on the E-3A and a TADIL B-based ground environment. The ASIT is housed in a transportable shelter. The system performs functions similar to the MPC but provides conversions only between the Interim JTIDS Message Standard (IJMS) used by the JTIDS Class 1 terminal and TADIL B. In exercises, the air surveillance data from the E-3 can be transmitted in UMS format to the ASIT where the information can be converted to the TADIL B format and passed via. the MCRC through the USAF MPC or to the US SAM TSQ 73 Missile Minder system.

The reinforcement TACC CRCs and Control and Reporting Posts (CRPs) are currently equipped with the Hughes 4118 computers to assist air track generation/correlation and the maintenance of the air picture. The system normally receives the air track information from the various ground-based air surveillance radars and the E-3. Track data from the E-3 are first transmitted to an MPC via. the TADILA link and/or the ASIT via. a JTIDs link. The MPC translates the TADIL A track messages to TADIL B format and then transfers them to the H4118 computers. In addition, the reinforcement TACC can possibly bring into the theater a Computer Assisted Force Management System (CAFMS) to assist offensive air operations. The system is based on the Perkin Elmer 3230 mainframe with software developed by TAC. It assists in the preparation and distribution of the ATOs. Furthermore, it supports the maintenance of data files on the resources at the airbases and the status/readiness of the tactical wings and squadrons. The USAF and USMC have been pursuing a joint program to develop transportable tactical air surveillance and control information processing system. The USAF system under the program is called the Modular Control Element (MCE). It will replace the current operational facilities and associated ADP support for the USAF CRCs and CRPs. The basic element of the MCE is the Operations Module (OM). Each OM consists of computers and communications equipment and is capable of supporting tactical air surveillance, tactical air control and message translation functions. The message processing part of the OM supports the conversion among the various tactical data link standards such as TADIL A, TADIL B and ATDL-1. A space is available in the OM to accommodate a JTIDS Class 2 terminal. Several OMs can be interconnected to increase the MCE's capacity and enhance its survivability through graceful degradation. The USMC counterpart is called Tactical Air operations Module (TAOM). The TAOM is very similar to the MCE OM, with some differences in the size and weight of the OM shelter. A Digital Communications Terminal (DCT) is a small, lightweight, handheld message processor used to transmit air request messages between the TACPs and ASOCs. The DCT has a graphics capability and can compose, edit, display, process and store fixed format or narrative messages. The DCT can be used in conjunction with standard military radios and can burst transmit the air request message in <5 sec. The system is being developed by the USMC and the USAF procurement will be attached to the Marine Program.

The US army brigades and battalions are equipped with the same ANITSQ-73 Missile Minder Systems as the ROK Air Defense Artillery (ADA) units and perform the same functions. The air track data from the US, brigade TSQ 73 systems can be directly transferred to the MPC and/or to the H4118 computers of the reinforcement CRCs and CRPs via. the TADIL B link. However, the ROK TSQ-73 cannot directly transfer data to the US, TSQ 73 systems because of certain software incompatibilities. The ROK procured the basic Foreign Military Sales (FMS) software package for the TSQ 73 and did not buy the periodic upgrades that have been incorporated into the U.S. version of the system. The major Navy ADP system is the Navy Tactical Data System/Air Tactical Data System (NTDS/ATDS) (TCG., 2015). The NTDS is the Navy-wide data system with computers or terminals located onboard most naval vessels. The ATDS is the airborne equivalent of NTDS. Functions performed using the NTDS/ATDS include air, surface and subsurface surveillance/control; planning/tasking and database maintenance. In addition to the surface-based air surveillance systems, the Navy relies on the airborne E-2Cs for wide-area, low-altitude surveillance. Track data from the E-2C is normally transferred to the NTDS via. TADIL A. Interfaces between the various NTDS/ATDS components, as well as with similar systems operated by the other US. Services such as E-3 and TAOC-OM are also accomplished using TADIL A. The Marine Corps relies on the Marine Air Command and Control System (MACCS) to support air operations. The current ADP support comes from the Tactical Air Operations Central (TAOC Q-2) processor for data maintenance and Tactical Data Communications Central (AN/TYQ-3A) for message transfers. The Marine systems are capable of operating on both TADIL A and TADIL B.

RESULTS AND DISCUSSION

Assessment combined tactical air operations: Improvements implemented during the early to mid-1990s have significantly enhanced the KTACS capabilities. For air defense operations, the establishment of the MCRC operational facility and the installation of the MCRC ADP system have enabled the MCRC to receive and process track data through manual intervention. The resultant air pictures are real-time and comprehensive compared to the slow and at times incomplete air pictures produced with the previously manual procedures. The installation of the large number of control display consoles in the MCRC and the availability of the real time air picture to the controllers have vastly improved both the ability and capacity of the controllers and the KTACS as a whole in performing such tasks as warning, weapons assignment, intercept control and airspace management. For offensive air operations, the constant watch KCSS supports information management at HTACC. The system's electronic interfaces with the various ROK and US. organizations and units external to the HTACC such as WOCs and ASOCs through remote sub-hosts and terminals have considerably shortened the time required the dissemination of ATOs. However, some areas still require additional attention.

Survivability: The continuity of operational capabilities is very limited if the HTACC becomes in operational or is otherwise neutralized. Although, the HTACC facility is expected to exhibit a high degree of survivability against conventional physical attacks its communications outlets such as antennas and fiber optics cables for connectivity with other external organizations can still be vulnerable given the size and training of the North Korean Special Operational Forces (SOFs). The MPC and the ASIT provide key support to air surveillance activities at MCRC but they are vulnerable. The MPC receives and integrates air track data from the USAF E-3 and other reinforcement air surveillance systems such as TADIL A and TADIL B before passing the data to the MCRC ADP. Even the ASIT which converts the Interim JTIDS Message Standards (IJMS) data to TADIL B is linked to the MCRC ADP through the MPC. Both the MPC and ASIT are currently situated on an open pad outside the HTACC facility. They would be highly susceptible to direct enemy attacks or to the blast and shock effects of nearby explosions.

Interface and interoperability: Tactical air units from any of the US. Services could be deployed to or operate in the vicinity of the Korean Peninsula. The in-country KTACS systems must be able to interact with systems supporting the reinforcement forces. Table 2 lists the existing and potential systems-level interface needs. The list of interfaces included in the table is based on the operational interface need lines. Table 2 shows that automatic interoperability among the tactical air surveillance and control systems such as MCRC ADP, USAF TACS (Tactical Air Control System), AAWCIC (Anti-Air Warfare Combat Information Center), TAOM (Tactical Air Operations Module) already exists. The key consideration is therefore configuration management, so that, interoperability can be maintained when either US or ROK systems are upgraded (Park, 2015). In the event that the HTACC facility becomes in-operational, there would be virtually no in-country backup capability. There is no alternate TACC in-country. The surviving KTACS CRCs and CRPs have very limited air surveillance and control capability, relying solely on manual procedures. US reinforcement forces from any of the services could be deployed to the Korean theater. It appears that specific concepts of operations to ensure integrated air operations between the in-country and reinforcement elements have not been fully developed. While there is a general acknowledgement that the ROK and reinforcement US tactical air forces and elements combined and integrated fashion, there are no specific plans nor bilaterally developed agreements on, for example, the relative roles and interactions between the remaining KTACS elements and the US reinforcements of matters relating to the planning for and control of the available ROK and US forces. Likewise, operational concepts and procedures are needed concerning the interface and interactions of the ROK and reinforcement US HIMADS (High and Medium altitude air Defense), AN/TSQ-73 Missile Minder, even though technical interoperability via. TADIL B between the national force's systems already exists.

Table 2 also shows that interoperability is needed between the CAFMS that could be deployed with the reinforcement TACC and the OIA systems and sub-hosts in-country. Without this interoperability, the CAFMS would not be able to maintain duplicate copies of the KCSS databases nor interact with the in-country WOCs to effectively conduct tactical air planning and ATO preparation capability. Communications assets needed and plans for connecting the reinforcement and in-country systems are also important to ensure the timely dissemination of ATOs and other operational and intelligence information. And survivability of the intelligence support capability can be enhanced by

Table 2: Potential system level interface needs for combined air operations

Node A	Node B	Principal ADP interface	Current interface Level	Current interface Status	Future level
Among in-place unit					
HTACC	WOCs	OIA/KCSS-OIA/SH	1	E	3
HTACC	ASOCs	OIA/KCSS-OIA/SH	1	E	3
MCRC	ROK HIMADS	MCRC ADP-TSQ-72	3	E	3
MCRC	ROKN Units	MCRC ADP-KNTDS@	N/A	N/A	3
Between in-place and re-information units					
MCRC	USAF CRC/P	MCRC ADP-TACS ADP	3*	E	3
MCRC	USAF E-3	MCRC ADP-E-3 ADP	3*	E	3
MCRC	USA HIMAD	MCRC ADP-US. TSQ-73	3*	E	3
MCRC	USN AAWCIC	MCRC ADP-ATDS	3*	E	3
MCRC	USN E-2C	MCRC ADP-E-2C ADP	3*	E	3
MCRC	USMC TAOC	MCRC ADP-TAOM	3*	E	3
HTACC	USAF TACC	MCRC ADP-CAFMS	N/A	N/A	3
WOK	USAF TACC	OIA/SH CAFMS	N/A	N/A	3
ASOC	USAF TACC	OIA/SH CAFMS	N/A	N/A	3
ROK SAM	USAF CRC/P	ROK TSQ-73-TACS ADP	3+	E	3
ROK SAM	US SAM	ROK TSQ-73-TSQ-73	3+	E	3
ROKN Units	USAF E-3	KNTDS@-E-3 ADP	N/A	N/A	3
ROKN Units	USN AAWCIC	KNTDS@-ATDS	N/A	N/A	3
ROKN Units	USN E-2C	KNTDS@-ATDS	N/A	N/A	3

@-system currently under development; *-thru USAF Message Processing Center (MPC); +-technical interface capability already exists but operational and procedural arrangements need to be established; OC-Wing Operations Center; ASOC-Air support Operations Center; Tactical Air Control System-KTACS; HIMADS-High and Medium Altitude air Defense; ATDS-Air Tactical Data System; HTACC-Hardened Tactical Air Control Center; SH-Support Helicopter; OIA-Operations and Intelligence Automation; CAFMS-Computer Assisted Force Management System

acquiring a certain degree of mutual backup between the KAIS and KISS systems. Common interest and capability appear to exist whereby selected intelligence support functions and associated databases such as order of battle can be duplicated on the two systems.

Capability of tactical air operations: The constant watch KCSS incorporates an automated capability to assist in the preparation of ATOs. However, that capability is not in use because of the difficulties involved in its application. Instead, a word-processor-based software called PC Frag has been used to prepare the ATO which in turn was disseminated over the KAIS/KCSS communications connectivity to the WOCs, ASOCs, etc. As part of the OIA improvement program, user friendly ATO preparation software will be provided. At the same time, an improved version of PC Frag called Frag Works is also being developed. Both of these software tools will become available at about the same time frame. It is important that the various existing and future versions be carefully examined to select the most suitable software tool that is to be used by all involved.

CONCLUSION

In this study, we studied tactical operations in the Korean theater by the armed forces of the ROK-US Combined Forces Command and procedures for the integration of Theater Air-ground System. The key consideration is configuration management, so that, interoperability can be maintained when either US or ROK systems are upgraded. There are no specific plans nor bilaterally developed agreements on the relative roles and interactions between the remaining KTACS elements and the US reinforcements of matters relating to the planning for and control of the available ROK and US forces. We believe operational concepts and procedures are required concerning the interface and interactions of the ROK and reinforcement US HIMADS and the various existing and future versions be carefully examined to select the most suitable software tool that is to be used in combined tactical air operations.

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