Appendix B

DIGITAL CAVALRY OPERATIONS

The digitized squadron is composed of forces equipped with automated command and control systems and compatible digital communications systems. The major components of the digitized squadron are incorporated into the Force XXI battle command brigade and below (FBCB2) concept. The central components of the concept addressed in this appendix are as follows:

- The M1A2 Abrams tank with a digital command and control system.
- The Bradley cavalry fighting vehicle (CFV) equipped with a digital command and control system.
- The OH-58D enhanced Kiowa Warrior equipped with the improved data modem (IDM) and the video image crosslink (VIXL).
- A gateway that will allow digital systems to have connectivity.
- The lightweight computer unit (LCU) and its digital software.
- The dismounted soldier system unit (DSSU) and its digital software.

The term *digitized squadron* used in this appendix refers to the tank and CFV squadron equipped with these central components. Numerous other automated systems in the Army may have some effect on digitized squadron operations. These systems are addressed only as they relate to digitized squadron operations.

This appendix addresses the capabilities and limitations of the digitized squadron operating with both digitized and conventional combat and combat support assets. It also addresses the organization and functions and the additional planning and command and control functions performed within the digitally equipped squadron. It defines the use of digital communications technology within the framework of the seven battlefield operating systems.

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Section I. Capabilities and Limitations

The digitized squadron possesses an improved capability to achieve the agility, depth, and synchronization that characterize successful Army operations. Commanders must fully understand and selectively employ these improved capabilities during the execution of a mission to maintain synchronization with both digitally and conventionally equipped units. Leaders at every level must remain cognizant of the fact that some critical combat and combat support assets may be unable to share the time-saving benefits of automation in receiving, processing, and distributing combat information. The goal is to equip the digitized squadron, combat support, and combat service support assets with a seamless digital command and control system.

The capabilities and limitations of a digitized squadron are distinctly separate from its conventionally equipped predecessor. These enhancements center around the FBCB2 concept. The M1A2's position navigation (POSNAV) system, the commander's independent thermal viewer (CITV), the CFV equipped with a digital command and control system, and the OH58D with embedded global positioning system (GPS) and VIXL provide additional capabilities for the commander not available in the conventionally equipped squadron. Along with these capabilities, however, are limitations in interfacing with both digitized and conventional combat and combat support assets typically arrayed within a squadron.

CAPABILITIES

The commander of the digitized squadron has significant advantages over his conventionally equipped counterpart. The following are the most significant advantages:

- Increased situational awareness.
- Enhancements to the planning and orders preparation and distribution process.
- Digital aids that enhance the timeliness and accuracy of the reporting process and employment of squadron assets.

The commander employs some or all of these enhancements to improve the combat potential of his squadron based on the factors of mission, enemy, terrain, troops, and time available (METT-T).

Situational Awareness

The increased situational awareness provided to the commander by digital command and control systems is a significant aid to squadron command and control. By observing his digital tactical display, the commander can see icons representing the location of friendly subordinate elements operating on the squadron SINCGARS radio or digital communications net. The friendly unit icons are created through

automatic position updates digitally broadcast by each active vehicle or aircraft. The commander can also display the units' operations overlays on his tactical display screen to see their locations relative to his control measures. When used correctly, these systems provide the commander with a good idea of the location and disposition of the squadron's digitally equipped combat and combat support units. With this information the commander and his staff are able to make informed decisions and respond more quickly and decisively to changes in the tactical situation.

Planning Process

Digital command and control systems on the OH-58D provide significant enhancements to the squadron planning process. The squadron commander and staff can digitally issue warning orders with draft operations overlays early in the orders process to allow subordinate commanders and leaders to begin their troop-leading procedures, rehearsals, and reconnaissance much sooner than previously possible. The staff can significantly enhance the distribution of CS overlays, such as fire support, enemy, and obstacle overlays, allowing the CS elements to begin troop-leading procedures before the OPORD is actually issued. When the staff has completed the planning process and is prepared to issue the OPORD, it digitally sends updated operational overlays to subordinate commanders and leaders before the OPORD is issued. This allows troops to initiate actions at their level while the commander is away receiving the OPORD. There are many other ways the commander and staff can use digital communications to provide rapid, accurate flow of critical information to enable parallel planning at all echelons. METT-T and the creativity of the units determine how they can most effectively use the digital systems available to them.

Reporting Process

The ability to digitally send tactical reports aids the commander in shaping the battlefield and reacting to changing tactical situations. Future digital systems will have preformatted reports the user can quickly produce and send. Contact reports and spot reports are the primary combat reports used to help the commander develop the tactical situation. The initiator of the digital report can create an enemy icon on his tactical display by lasing to a potential target. He then has the option to digitally send that icon, with some descriptive text, up the chain of command as a contact or spot report. Upon receipt of the report, the recipient can review it and the location of the enemy icon, and he too has the option to send it to his higher headquarters. At each level of command, the recipient of the report can look at the reported enemy element's location, compare it to his operational graphics and friendly unit locations to determine potential problems with the disposition or orientation of friendly units, and adjust accordingly. Additionally, all contact and spot reports can be converted into calls for fire or close air support requests with one additional button-push at any level of the reporting hierarchy.

There are also automated logistics reports available to aid the squadron commander and staff. These reports assist the squadron staff in assessing the logistics status of subordinate units and pushing support forward.

LIMITATIONS

There are limitations, even with the enhanced capabilities of the digital systems. Two of the limitations areas follows:

- Digital communications on SINCGARS radio and digital communications nets require precise procedures and strict net discipline.
- Digital to nondigital information/data exchanges (and vice versa) require additional resource and time expenditures.

The most significant limitations are as follows:

- Some of the key combat, CS, or CSS elements of the squadron and/or adjacent units may not be equipped with digital systems.
- The physical limitations of the digital hardware and software.

Each shortcoming has a solution and is merely presented to illustrate that digital communication technology, although very powerful, is not completely mature.

Nondigital Subordinate and Adjacent Units

The integration of conventionally equipped (nondigital) elements into the digitized squadron presents special challenges for the squadron commander and staff. The commander must specify procedures for communicating both digitally and by voice. The commander must make provisions for the nondigital unit to receive automated information with the rest of the squadron. Additionally, nondigital adjacent units will not have the benefit of the automated information-sharing capabilities. Units must establish liaison officers or other positive control measures to ensure proper coordination is completed. Several techniques for accomplishing these tasks are addressed in preceding chapters.

Hardware and Software Limitations

With the increased reliance on digital technology comes the limitations of the hardware and software associated with the systems. Each version of software used in these digital communications systems has peculiarities unique to that system. For example, some digital software restricts the destination of some reports and overlays to a specific routing matrix. Also, the user has relatively little flexibility in terms of what types of messages can be sent and what graphic control measures are available for use on overlays. The hardware has limitations as well. The current electronic technology is not perfected for a single communications net to host both voice and digital traffic simultaneously. The result is at times the two conflict, resulting in

degraded performance in digital traffic, voice traffic, or both. There are also limitations in the memory capabilities of the computer systems. When messages or, in particular, overlays exceed the system's memory capabilities, units will have trouble transmitting the message or overlay. Given these limitations, the commander must decide when the use of digital reporting is counterproductive. There are some cases, such as during offensive operations, when voice reporting may be more expedient and digital reports used as follow-up reports.

SOLDIER-MACHINE INTERFACE

Rapid advances in automated command and control systems require commanders and soldiers to operate highly sophisticated equipment to enhance their ability to function effectively on the battlefield. Additionally, digital battle command platforms present the challenge of receiving critical battlefield information, analyzing it, and issuing plans and orders while conducting mobile operations. The squadron commander does not gain an advantage over the enemy simply by using automated equipment. He achieves the advantage by using the information to position the soldiers and killing systems at the decisive point on the battlefield in a timely manner. This enables the squadron commander to mass direct and indirect fires on the enemy and to synchronize all seven battlefield operating systems.

Optimizing the benefits of automated information begins with discretion in the use of digital reporting. Common problems with automated information systems are redundant reporting and information overload during critical periods of the battle. SOPS and rehearsals are essential when employing sophisticated digital technology on the battlefield. Commanders must not become fixated on information presented on the commander's digital display or LCU/DSSU screen. These displays are not a substitute for a map or the commander's eyes. They are simply an aid in managing and presenting combat information for the purpose of decision making. The well-established principles of leadership and the warrior spirit will always be a required trait of combat leaders on the battlefield. The digitized systems in the squadron serve as an enhancement to the commander and are not a substitute for decisive personal leadership.

Section II. Organization and Functions

This section highlights the additional capabilities and functions the digital communications systems bring to key leaders within the digitized squadron.

SQUADRON COMMANDER

The role of the squadron commander is essentially unchanged from that described in Chapter 2. With improvements to digital command and control technology, the squadron commander has at his disposal timely and highly accurate

friendly and enemy information. The net effect is increased situational awareness. The commander will be able to see the battlefield more clearly and potentially will be able to make more informed tactical decisions. When properly positioned, digitized units provide the squadron commander with continuous and highly reliable combat information necessary to make timely battlefield decisions.

SUBORDINATE COMMANDERS

Troop commanders directly influence operations by conducting reconnaissance and security operations in support of the squadron. When required, they employ fire and maneuver to destroy the enemy. They are the squadron commander's principal assistants in fighting the battle. Commanders use digitally generated combat information to guide the employment of organic combat elements and to synchronize the use of combat support assets provided by the squadron commander.

When operating task organized with nondigitally equipped units, troop commanders exploit the position location capabilities of the M1A2 to fix the location of the enemy and to issue pertinent maneuver instructions by voice. When equipped with a digital interface, they monitor the position of friendly and enemy elements with respect to published control measures, using automated information to make timely battlefield decisions.

SQUADRON STAFF

The squadron staff assists the commander in doing all things necessary to coordinate and execute the stated scheme of maneuver. The staff functions as outlined below.

- Interfaces with the digital systems throughout the planning process and during the battle to monitor the tactical situation.
- Has access to many or all of the digital reports and overlays available.
- Benefits from increased situational awareness provided by digital systems.
- Is better able to anticipate the requirements of the squadron.
- After the battle, uses automated reports to rapidly aggregate pertinent personnel and logistical information relating to sustaining the force.
- Through automated CSS systems, is able to quickly assess and respond to the logistical needs of the squadron.

COMBAT SUPPORT

The squadron commander uses selected CS assets (field artillery, close air support, air defense artillery, engineers, military intelligence, and chemical units) to integrate and synchronize combat multipliers in support of his scheme of maneuver. Digital interfaces with these elements will tighten their integration into the planning

process and improve their situation awareness during tactical operations. Most or all of these elements at the squadron level will have some access to digital communications systems, although task-organized elements, such as individual engineer squads, may not. The integration of these elements will present special challenges at echelons below the squadron level. Commanders will need to ensure information from maneuver digital nets is passed to supporting CS elements. As stated previously, commanders must make special provisions for these elements to receive and send vital information passed on the digital nets.

Section III. Battlefield Operating Systems

Squadron functions are grouped into seven categories or battlefield operating systems that must be integrated to support the commander's intent for a military operation. The functioning of each system requires the coordinated efforts of all elements of the squadron. The commander and staff integrate these systems into a combined arms force tailored to the situation. The introduction of digital communications and the unique capabilities it brings to the battlefield augment, but do not change, these battlefield operating systems.

The digitized squadron can employ multiple force protection measures to increase the survivability of the force. The enhanced command and control capability allows the squadron to maximize tactical dispersion for protection during reconnaissance operations and to converge or mass when needed during security operations. This translates into a greater ability to achieve tactical deception and operations security. Additionally, the precision movement capability described in the Maneuver paragraph is very beneficial in avoiding hazardous areas common to the modem battlefield and enhances its potential to achieve surprise during combat.

INTELLIGENCE

All units within the squadron have a responsibility to report information about the enemy. Digitized units enhance the information-gathering capability of the squadron with their ability to quickly and accurately report enemy locations. The digitized cavalry troop can pass pertinent enemy and obstacle information gathered during reconnaissance digitally to the squadron S2 who uses the information to confirm or deny his automated situational template. With the introduction of digital intelligence information networks, the squadron S2 receives more complete and accurate information from brigade and higher intelligence sources. He is able to create an enemy overlay and provide the information to maneuver commanders.

MANEUVER

The troops of the squadron seek to locate enemy forces and provide information on terrain during reconnaissance operations, and during security operations, they provide early warning and impede the enemy. The digitized troop uses information-sharing capabilities, the advanced position location and target acquisition capabilities of the M1A2, OH-58D, and digitally equipped CFVs to identify the enemy and to facilitate the development of the situation. All other squadron assets use their digital capabilities to support these maneuver elements.

Digitally equipped leaders integrate nondigitally equipped combat elements into the scheme of maneuver by passing pertinent information by voice. Once they make enemy contact, the troop executes battle drills and develops the situation primarily using voice communications. When the troops complete the contact or come to a lull in the battle, they follow up voice reports with digital reports to complete the information transfer to higher headquarters.

The digitized squadron has significant enhancements in the area of precision navigation. The addition of POSNAV and other navigational systems allows digitized units to be extremely effective in moving rapidly with great accuracy, even during periods of limited visibility. The following are results of this capability:

- Increased effectiveness in synchronizing the movement and maneuver of forces.
- Hazard avoidance, such as contaminants and obstacles.
- Accurate battle reporting (location).
- Enhanced planning and engaging of targets.

The addition of the CITV improves the all-around surveillance and target acquisition capability of these units under similar conditions.

FIRE SUPPORT

The squadron commander integrates his fire support plan to suppress, neutralize, or destroy the enemy. The fire support officer assists the commander in this process by planning and coordinating fire support. The digital fire support system will have a sensor-shooter link that will enable the fire request to be sent directly to the supporting unit. The digitally equipped fire support element and the squadron fire support officer will remain the primary means for requesting and approving fires. The digital fire support system will be designed to be routed through commanders at each level. As always, missions fired are based on the commander's guidance for fire support established during the planning process.

AIR DEFENSE

The air defense officer (ADO) in the squadron can monitor and send digital traffic on the squadron command net. The ADO will receive a correlated air picture from his digital system sensor in his respective area of operations. The sensor will send early warning air track data to the air defense platoons, sections, fire units, and the brigade air defense liaison officer.

Air defense platoons, if sliced to the squadron, can share this early warning track data at that respective TOC or command post. The maneuver commander benefits from the added situational awareness provided; however, the air defense weapon systems will most likely not be digitally equipped with maneuver force software that allows command and control functions to occur. That function must be "voiced" to the air defense elements to ensure they receive the necessary information to support the scheme of maneuver.

MOBILITY AND SURVIVABILITY

With digital capabilities, the squadron engineer can more effectively assist the commander by providing terrain data and analysis and creating and modifying the squadron obstacle overlay. He can also better integrate the obstacle plan into the squadron scheme of maneuver by electronically overlaying the squadron engineer's obstacle intent overlay on the operations overlay. Troops can assist the squadron engineer by updating or modifying the obstacle overlay with any troop-emplaced obstacle or changes to the squadron obstacle plan.

Digitally equipped combat vehicles with laser designation capabilities are particularly well suited for actions during breaching operations. The digitally equipped troop can use the LRF/POSNAV interface to designate the left and right limits of enemy obstacle systems for follow-on forces. Automation enables troops conducting reconnaissance to identify and report existing bypass routes, mechanically breached lanes, or suitable breach sites for the engineers. Besides information about conventional obstacles, this same capability can be applied to quickly modify the advance guard commander's scheme of maneuver to respond to contaminated areas of the battlefield.

Not only can the commander use his digital assets to avoid contamination, he can also decrease the risk that his unit will be targeted with NBC weapons. The ability to increase the dispersion of his vehicles while maintaining command and control decreases the unit's signature. The threat commander will have fewer vehicles in a particular area to target. This will force him to either increase his target area, thus decreasing the concentration, go ahead and target the smaller unit, or decide not to use chemical weapons due to their limited tactical value. Either way, the threat to the friendly force is decreased.

LOGISTICS

Combat service support constitutes all actions taken to sustain the squadron's ability to fight. The combat trains command post and all other CSS elements of the squadron can communicate digitally on both the squadron command net and the administrative/logistics (A/L) net. This enhances situational awareness and enables logisticians to anticipate the needs of maneuver elements and support the squadron commander's intent.

Critical sustainment functions are incorporated into the digital command and control system in the form of automated SITREPs. The SITREP summarizes the unit's manning level, ammunition stockage level, fuel level, and tracked vehicle status. Troop first sergeants or XOs periodically forward these reports digitally during the battle to assist the S4 in forecasting support requirements. After the battle, automated SITREPs are supplemented with detailed logistical voice reports to request additional logistical support.

Medical evacuation of a vehicle crew is facilitated by the automated MEDEVAC report. This report contains pertinent information found in the standard nine-line voice report format and allows medics to navigate quickly and accurately to designated locations with a GPS. This format is also useful for rapidly reporting specific evacuation requirements and locations of digitally equipped combat vehicles.

COMMAND AND CONTROL

The commander fights from a forward location where he can see, hear, and influence the battle. He uses a combination of voice and digital orders to control his subordinate units. His subordinate commanders and soldiers must be aware of his presence on the battlefield.

Automation allows the squadron commander to accurately track the progress of digitally equipped combat vehicles operating on the command net and to clearly identify the relationship of the enemy to friendly units and his control measures. With digital systems, the commander can see the battlefield better. He knows the location and disposition of his subordinate elements beyond the line of sight and during periods of limited visibility.

Before the battle, the squadron augments traditional overlay techniques with automated equivalents to speed the distribution of information. Digital communications allow the squadron commander to augment face-to-face and radio communications with digital traffic when the situation permits. This is key when time is crucial to the success of the mission. Automated control measures are extremely helpful when executing contingency or follow-on operations. Commanders can issue FRAGOs using existing graphics, or if time permits, digitally send an updated operations overlay.