Digital Systems and Battle Staff Integration: Collective Training Feedback

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ABSTRACT

The U.S. Army has provided battle staffs with a mixture of digital command, control, and communication (C3) systems as aids in mission planning, preparation, and execution. The purpose of this project was to provide guidance for collective trainers to use in evaluating battalion and brigade level employment of these systems, emphasizing the integration and synchronization of activities across battlefield operating systems (BOS) such as maneuver, intelligence, and fire support. An important goal of this effort was to provide guidance that is appropriate for information integrators, rather than system operators, so that most of the guidance can remain applicable as specific digital systems are replaced or evolve. The resulting Digital Tactical Operations Center (TOC) Integration Guide is organized according to the three goals of (1) establishing and managing the common operating picture, (2) managing digital information, and (3) applying situational awareness to avoid fratricide. Under each goal, the guide describes what the staff sections should be doing and tells trainers how to obtain information needed to assess staff performance. A companion product, the Digital Proficiency Level Matrixes for Battle Staff Sections, describes low, medium, and high levels of digital proficiency. The specific parameters applied to each staff section in the matrix are tailored to fit the functions of the section, but there are recurring themes. Two key indicators of increased digital proficiency are an earlier shift from stove-piped to collaborative activities during planning and an increased ability to update and distribute planning products in a timely manner. The research team is currently updating guidance to reflect recent changes in the digital systems available to battle staffs. The update process provides an opportunity to assess the extent to which the guidance remains viable as systems change.

ABOUT THE AUTHORS

Dr. Larry Meliza is a research psychologist with the U.S. Army Research Institute. He has over 25 years of research/development experience in collective training that includes: describing training detractors; developing methods for describing collective training requirements that make it easier to plan, prepare, and conduct training; developing after action review systems, evaluating computer generated forces, and describing the impacts of force modernization on exercise control and feedback workloads of trainers.

Karen Lockaby has over 20 years of experience in Army training development and assessment. She has served in many projects supporting digitization of Army units and is the primary author for the Digital Operating Guide for Brigade and Battalion Staff and the FBCB2 Digital Operators Guide.

Dr. Bruce Leibrecht has over 36 years of experience in behavioral research and analysis. This experience includes measuring the impacts of digitization of Army combat vehicles on unit performance in a virtual environment at a time when digitization was still at the early concept stage. More recently he has been involved in describing the impacts of digitization experience on the behaviors and attitudes of units.

Andrew Perrault has over 32 years of experience in Army training, development and assessment. He has served on many projects supporting digitization of Army units and is one of the authors and the primary subject matter expert for the Digital Operating Guide for Brigade and Battalion Staff.

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IMPACTS OF DIGITIZATION ON COLLECTIVE TRAINERS

Planning, preparing, and executing Army missions requires the integration and synchronization of maneuver, command/control, intelligence, combat service support, fire support, air defense artillery, and mobility/countermobility battlefield operating systems (BOSs). The army fielded networked, automated command and control systems, in part, to help integrate and synchronize activities among the BOSs. Generically, these systems are referred to as the Army Tactical Command and Control Systems (ATCCS). The purpose of the research and development described by the paper is to help collective trainers provide battle staffs with feedback concerning their application of these systems. This work was performed under the sponsorship of the III Corps Battle Command Training Center and the U.S. Army Training and Doctrine Command.

Trainers for collective exercises have long been overwhelmed by exercise control and feedback activities, and digitization has the unintended consequence of adding substantially to the trainer's workload. (Brown, Nordyke, Gerlock, Begley, and Meliza, 1997). In addition to existing, tactical observation and analysis requirements, trainers for digitized units must be concerned with how units use digital systems to support operations and how users interact with digital systems. The trainer's workload is increased further by the fact that the number and features of digital systems are continually changing.

Table 1 illustrates the variety of digital systems available to battle staffs. To the extent that collective trainers become involved in the operation of these systems, operator training can become a detractor to collective training. The present effort was based upon the assumption that the best way to help trainers cope with the digital workload is to focus their attention on how to employ this mix of systems to support operations. The research team previously used this approach to provide guidance for collective trainers to use in assessing how well units employ the Force XXI Battle Command Brigade and Below (FBCB2) system on board tactical vehicles to support operations (Meliza, Lockaby, and Leibrecht, 2003a; Leibrecht, Lockaby, and Meliza, 2003b). FBCB2 users are the parties responsible for executing the plans developed by battle staffs.

Table 1. Digital Command and Control Systems Supporting Battlefield Operating Systems (BOSs)

BOS	Digital Systems
Maneuver	Maneuver Control Station Work Station (MCS-WS) and MCS light (MCS-L)
Intelligence	All Source Analysis System (ASAS) Work Station (ASAS-WS) and ASAS light (ASAS-L)
Fire Support	Advanced Field Artillery Tactical Data System (AF ATDS)
Mobility/ Countermobility/ Survivability	Digital Topographic Support System (DTSS), MCS-WS, and MCS-L
Command and Control (including signal)	Force XXI Battle Command Brigade and Below (FBCB2), Tactical Internet Management Software (TIMS), Enhanced Position Location Reporting System (EPLRS) Network Management Tool (ENM), MCS-WS, and MCS-L
Air Defense	Air and Missile Defense Workstation (AMDWS) and Forward Area Air Defense (FAAD) System
Combat Service Support	Combat Service Support Control System (CSSCS), MCS-WS, MCS-L

APPROACH

There is a need for training feedback guidance that links use of digital systems to tactical operations. There is a need for training feedback that provides

diagnostics and corrective action items. After a collective exercise, battle staffs should understand how their use of digital systems supported operations and how they can change their behavior to reap greater benefits in future operations. The research team described the tactical benefits of digital systems from a variety of perspectives. The team also identified problems in applying digital systems and procedures expected to overcome problems. This information was gained by reading lessons learned reports, interviewing experienced digital units, observing (and in some cases supporting) collective training exercises for digitized units, and interviewing contractor personnel responsible for providing digital support to units.

In developing guidance for battle staff trainers, the research team considered:

- Potential benefits of digitization in addressing frequently observed problems in unit performance
- Reported tactical benefits of digitization
- Potential digital support of battle staff functions
- Potential digital support of the BOS synchronization process
- Problems applying digital systems
- Differences between brigade and battalion level applications of digital systems
- Digital battle staff proficiency level concepts

Consideration of these variables provided information about aspects of battle staff employment of digital systems that warrant address in the context of a collective exercise. The next step was to design a format for providing information to meet the needs of brigade and battalion battle staffs and their collective trainers.

The next section of this paper presents illustrative findings relevant to each variable. The section after that describes the format of a Digital Tactical Operations Center (TOC) Integration Guide, designed to support battalion and brigade battle staffs and their trainers.

ILLUSTRATIVE FINDINGS

Potential Tactical Benefits of Digitization and Enabling Digital Action Items

A unit must expend a substantial amount of effort learning to operate and apply digital systems before it starts to see a return on its investment (Dudley, Johnson et al., 2001). For this reason it is critical that units receive early feedback regarding their digital progress to motivate continued digital learning. Feedback should let units know if they have employed digital systems in ways that at least set the stage for reaping specific tactical benefits. By employing a mixture of methods for describing the benefits of digital systems, the team increased its chances of being able to motivate units. Identifying problems using digital systems and the impacts of these problems on operations helps complete the audit trail between digital activities and operations.

Potential Benefits of Digitization in Addressing Unit Performance Problems

Barnett, McCluskey, and Meliza (2001) identified frequently occurring problems in the performance of units at the U.S. Army's maneuver combat training centers that might be addressed, in part, through the application of digital systems. Table 2 identifies eight categories of performance problems and indicates the potential for sharing of evolving plans, improved situational awareness (SA), and the application of analytic tools to help address each category. These benefits are described below.

Table 2. Potentials for Digitization to Address Eight Frequently Occurring Problems in the Performance of Units

General Problem	Digitization Potential
Lack of awareness of some aspect of the tactical (friendly or threat) situation	Improved SA
Lack of synchronization (within or across BOSs) in terms of time, space, or activities	Improved SA, analytic tools, and sharing of evolving plan
Lack of awareness of some aspect of the plan or lack input to the plan by a BOS or sub-unit	Sharing of evolving plan
Details missing from plan	Sharing of evolving plan
Lack of understanding of the tactical situation	Improved SA and analytical tools
Key elements of the plan produced late	Improved SA and sharing of evolving plan
Inadequate mission preparation	Improved SA and sharing of evolving plan
Unit is highly vulnerable or lacks lethality	Improved SA and analytic tools

Capability to Share Evolving Planning Products

Digitization enables the capability to share evolving planning products in a networked environment, throughout a mission. Information is shared among staff sections and between staff planners and units responsible for plan execution. Plans can be changed to fit new information on the tactical situation and transmitted down to platform level (via FBCB2) to support execution. This is in comparison to a non-networked planning situation in which sections of a battle staff work on planning products in a stove-pipe fashion, attempt to integrate and synchronize components of a plan late in the planning process, and face a substantial challenge placing revised planning products in the hands of executing units.

The ability to share evolving planning products may ensure that all BOSs have timely and adequate access to planning products from other BOSs and echelons. This access, in turn, should help ensure that products are ready in time to support rehearsals and other mission preparation activities. It should also help to ensure that planning products are complete, synchronized, and reflect inputs from other BOSs and echelons.

Greater SA Enabled by Improved Data

Improved data on the tactical situation is a second benefit of digitization. Some of this improved information is provided by global positioning system (GPS)-enabled tracking of friendly vehicles and a variety of sensors (e.g., unmanned aerial vehicles). Improved data on the tactical situation is also provided by geo-referenced icons triggered by the use of structured digital messages (e.g., reports of the location of enemy minefields). These icons are automatically displayed on all systems within a network. "Hooks" can be attached to such messages to provide more detailed information about the element identified by geo-referenced icons. For example, a message hooked to a geo-referenced icon showing the location (center) of an obstacle can show the boundaries. Improved data on the tactical situation should feed and accelerate the planning process, reduce fratricides, increase the lethality of the unit, and reduce vulnerability of the unit.

Application of Analytical Tools

A third benefit of digitization that builds upon the first two is the availability of analytic tools. Use of these tools can have the effect of creating a higher level of situational awareness (SA) by helping a unit understand the implications of the tactical situation.

For example, a circular line-of-sight tool, combined with information on the location of threat forces, can be used to predict where friendly forces are likely to establish contact with the enemy. Other analytic tools may work in an automated fashion to alert users to threat situations (e.g., sounding an alarm when a platform comes close to a minefield).

Analytic tools help units gain a higher level of situational awareness as defined by Endsley (2000). The first level is characterized by an awareness of current elements of the tactical situation, the second by the ability to see the immediate implications of the current situation, and the third by the ability to see the future implications of a response to a situation. These levels of awareness may be illustrated using the game of chess. Each player in a game of chess has complete situational awareness in terms of knowing the location of all of the pieces. If a player makes a move strictly in response to threaten an opponent's piece or to protect a piece of his own, the player is operating at the second level of situational awareness. If a player is thinking many moves ahead, considering possible responses of the opponent, then that player is operating at the third level of SA.

Within this third level there may be further gradations of SA. One player may be focusing on how to take one of his opponent's bishops within two moves, while the other is focusing on how to place his opponent's king in check within seven moves. Analytic tools can move a unit up to SA level 2 or 3, and they can enable a unit to move to higher gradations of level 3.

Reported Benefits of Digitization

Unit self-reports of the benefits of digitization added to, and enhanced, the team's appreciation of the benefits of digitization. These findings suggest activities or events that trainers should attempt to observe when training battle staffs. Many of these self-reports were collected during interviews of experienced digital leaders (Dudley, Johnston, Jones, Strauss, and Meliza, 2001). Some of these self-reports are presented below. Unless noted otherwise, these self-reports are presented in Dudley, Johnston, et al., 2001.

- Planning never stops for the digitized unit (Lynch, 2001), because plans can be changed to take advantage of new information.
- Improved SA allows commanders of digitized units to develop intelligence requirements that are more specific than those of their analog counterparts.
- Commanders of digitized units may be more likely to change intelligence requirements as the tactical situation evolves.

- Less time must be spent trying to obtain information about the location of friendly forces, allowing more time to be devoted to other tasks.

- Being able to monitor the location of subordinates creates a situation where leaders are more likely to allow units to move quickly and aggressively.

Support of Battle Staff Functions and BOS Integration Processes

In preparing guidance for battle staff trainers, the research team also considered the potential for digital systems to support the BOS integration process shown in Table 3 and battle staff functions shown in Table 4. The lists of integration processes and battle staff functions were developed by the military SMEs on or supporting the research team.

The capability to make evolving planning products continually available to anyone with a need to know facilitates BOS integration. The digital environment provides a number of mechanisms to help ensure this availability. A key mechanism is the existence of folders that can be shared by the various BOSs. This may take the form of a common directory structure that allows one BOS to access and view the planning products of another BOS's home page. This common structure may also include the uploading of planning products on a networked computer system. Collaborative tools, such as white boards, make it possible for the various BOSs to view planning products as they are being modified.

The benefit of easy access to the most recent planning products from a BOS is diminished if other BOSs are unaware that a planning product has been updated; therefore, battle staffs must also employ mechanisms to ensure that other staff sections are informed when products are updated. Staff sections must be cognizant of how received information influences other planning processes and BOSs.

Table 3. Digital Applications with the Potential to Support BOS Integration Processes

Integration Process	Key ATCCS Applications
Share/exchange information between BOSs	• Shared folders, file transfer • Web site posting and access • Automated forwarding of information
Actively interact, coordinate and collaborate across BOSs	• Conference tools (chat, whiteboard) • Application sharing and collaboration • File transfer (send, receive)
Synchronize activities of related BOSs	• Digital synchronization matrix • Digital CCIR, PIR, FFIR, DP • COP-based SA and SU
Circulate staff planning products for review by other BOSs	• Shared folders • Web site posting and access • File transfer (send, receive)
Integrate separate BOS inputs into unified products	• Shared folders, file transfer • Application sharing and collaboration • Digital fusion of information
Plan and execute multi-BOS rehearsals	• Digital orders and overlays • Conference tools (chat, whiteboard) • Digital rehearsal capabilities

Certain digital applications in Table 4 impact multiple battle staff functions. The capabilities to maintain a common operational picture (COP), transmit orders and overlays digitally, and monitor intelligence requirements support a variety of staff functions. For example, if a battle staff fails to maintain a COP, it misses the opportunity to use digital systems to ensure the commander's intent is disseminated and executed, promote situational understanding within and across echelons, acquire, process and share timely and accurate tactical information, and anticipate and manage operational transition as mission requirements change

Table 4. Digital Applications with the Potential to Support Battle Staff Functions

Battle Staff Function	Key Digital Applications
Ensure the commander's intent is disseminated and executed	• Digital orders and overlays • Digital intelligence requirements • Common Operational Picture (COP) • Digital rehearsals
Support the commander's decision making process	• Digital intelligence analysis • Digital terrain analysis • Collaborative planning and wargaming • Digital Commander's Critical Intelligence Requirements (CCIR), priority intelligence requirement (PIR) friendly forces information requirement (FFIR), and decision points (DP)
Promote situational understanding within and across echelons	• COP • Digital messages feeding COP • Digital integration and sharing of information • Automated logistics monitoring
Coordinate and synchronize combat activities of subordinate and supporting units	• Collaborative planning and war gaming • Digital synchronization matrix • Automated alerts and warnings • Digital DP (SA-linked triggers)
Acquire, process and share timely and accurate tactical information	• Common Operational Picture • Digital messages feeding COP • Automated target management tools • Digital integration and sharing of information
Assess the effectiveness of combat actions in terms of the commander's intent	• Digital CCIR, PIR, FFIR • Digital battle tracking and battle damage assessment tools • Digital messages and alerts • Digital integration and sharing of information
Facilitate flexibility of tactical operations (contingencies, targets of opportunity, sequels)	• Digital CCIR, PIR, FFIR, DP • Digital intelligence analysis • Digital messages and alerts • Collaborative planning and war gaming
Preserve and sustain the combat power available to the commander	• Digital airspace/air defense management tools • Digital reports and messages • Digital logistics management tools • Automated alerts and warnings
Anticipate and manage operational transition as mission requirements change	• Digital intelligence analysis • COP • Collaborative planning and war gaming • Digital orders and overlays

Echelon Differences

Differences between brigade and battalion echelons in terms of digital system employment are described in Dudley, Hill et al.. (2002). As expected, some of the differences between echelons are due to the fact that additional digital systems are available at brigade level. Another important difference is that battalion is responsible for making sure the location of friendly entities shows up on SA displays for all echelons. The team also assumed that differences between echelons would directly reflect long established differences between battalion and brigades in terms of tasks and functions they were responsible for performing. Instead, the team found that digitization had an indirect impact on the roles and responsibilities of

these echelons. The U.S. Army correctly assumed that digitization would allow a force to control a substantially larger area, so it reduced the number of elements within a battalion. For certain combat tasks previously controlled at battalion level, it created a situation where control could be applied more effectively at brigade level.

Problems Applying Digital Systems and Solutions

Digital systems do not guarantee the great benefits described above will be reaped by a unit. Some of the problems that may occur if battle staffs are not prepared to employ digital systems are listed below.

- Individual staff sections may produce and refine planning products on computers but stay out of the network until late in the planning process.
- As a unit learns to refine and update planning products, individuals may become confused as to which versions of a particular product are the most current.
- Major changes may be made in planning products without other BOSs being aware of these changes
- An important change in the tactical situation displayed on computer screens may go unnoticed because no one is specifically given responsibility for monitoring the change
- Individual tailoring of SA displays may create situations where key leaders have substantially different views of the tactical situation
- Battle staffs may be unaware of the age or completeness of information shown in SA displays

A key generic problem in the employment of digital systems is the lack of standard operating procedures (SOPs) for handling information in a digital context. These SOPs are especially critical in enabling a unit to maintain a COP. For example, if a unit lacks conventions for naming versions of obstacle overlays, it is difficult to decide whether everyone is using the most current version of the overlay. An important indicator of how well prepared a unit is to employ digital systems is the availability of digital tactical SOPs (TACSOP). When collecting information on unit employment of digital systems it became apparent that the need for certain SOPs needs to be highlighted, such as the need for standardizing naming of overlay versions.

There are many actions units need to take in order to employ digital systems and reap tactical benefits. These action items tend to fall under one of the skill groups defined in Table 5. To be listed as a goal in this table, an item has to be associated with at least two action items. In many cases, there may be a half dozen or more action items associated with a goal. This table is included in this paper for two reasons. First, the skill groups provide a quick way of summarizing what digital skill proficiency measurement is all about. Second, the goals help to illustrate the breadth of the four skill groups.

.**Digital Proficiency Level Concepts**

The research team described basic, medium, and high staff proficiency levels with respect to specific staff sections and parameters (Leibrecht et al., 2004a). The parameters addressed focused on areas important in ensuring digital systems support battle staff functions and integration/synchronization of BOSs. Heavy emphasis was placed upon activities appropriate to information channeling and management skills, because they set the stage for assessing and exploiting digital information. As the U.S. Army gains greater experience applying digital systems, the focus should shift more towards assessing and exploiting information.

Table 5. Skill Groups and Goals Important in the Application of Digital Systems

Skill Groups	Goals
Channel Information: Make sure connectivity is maintained so information and requests flow across platforms, echelons, and battlefield operating systems	▪ Consider terrain impacts on placement of communication l assets and communication capabilities ▪ Ensure staff planning products can flow within sections and across sections and echelons ▪ Ensure entities are communicating and receiving information on friendly locations ▪ Check routing of messages ▪ Use time-saving methods (e.g., automated systems) to establish and monitor communication links and to diagnose problems ▪ Perform follow-up connectivity checks ▪ Diagnose problems at lowest feasible level to minimize downtime and maintain a common operating picture ▪ Bridge gaps between different digital systems ▪ Exchange planning products with non-digitized forces ▪ Optimize performance of systems and networks ▪ Maintain security of the common operating picture ▪ Maintain backups of critical data ▪ Minimize negative impacts of tactical operations center movement on operations
Manage Information: Make sure digital information is findable and catches the attention of intended message recipients	▪ Make sure recipients receive and/or attend to important messages ▪ Ensure leaders know where to look for information ▪ Reduce time required to prepare and disseminate overlays and other messages ▪ Avoid confusion over versions of planning products ▪ Delegate responsibility for monitoring digital information and sending reports ▪ Use automated alerts to reduce monitoring requirements ▪ Make information from external sources available to decision makers ▪ Ensure a common operating picture, rather than leaving it up to each decision maker to develop their own picture of the situation ▪ Filter and fuse information for decision makers
Assess Information: Examine and improve upon, the currency, accuracy, and completeness of digital information on the tactical situation	▪ Display, interpret, and improve upon information on the location of reporting and non-reporting systems ▪ Feed the threat picture ▪ Display and interpret the threat picture ▪ Control views of threat situations ▪ Refine and update planning products ▪ Monitor critical intelligence requirements
Exploit Information: Understand the implications of the situation and exploit digital command, control, and communication capabilities to improve tactical performance	▪ Avoid or prepare for readily apparent threat situations ▪ Identify and prepare for predicted, potential threat situations ▪ Avoid fratricides ▪ Navigate and select routes ▪ Control movement ▪ Predict contact variables ▪ Use data fusion tools to assess battlefield operating system synchronization ▪ Use digital audit trail to monitor the planning process ▪ Monitor combat power and supply levels ▪ Support post-mission reviews of unit performance

Table 6. Basic, Medium, and High Proficiency Levels for a Sample Battle Staff Section

Parameters	Staff Proficiency Levels		
	Basic	**Medium**	**High**
Creation/Updating of Products	Create products using analog and digital tools, staggering production; update rarely	Create most products using less efficient digital tools, concurrently; update frequently	Create all products using most efficient digital tools, collaboratively; update continuously
BOS Integration	Coordinate sporadically across BOSs using analog means, integrate digital products near end of planning	Share information across BOSs using less efficient digital means, integrate products late in planning	Conduct seamless BOS integration using digital collaborative tools, integrate products continuously
Management of Information	Manage flow and fusion of ATCCS information using analog procedures, without awareness of digitally unique aspects	Use simple standardized digital procedures (e.g., filter settings, file/folder naming conventions); react to fusion needs	Use advanced standardized digital procedures (e.g., chart tabs, shared folders, JVMF messaging); anticipate fusion needs
Distribution of Products	Distribute products via analog or physical means, with significant delays	Distribute most products by posting on web page, with minor delays; notify recipients sporadically	Routinely transfer products digitally, without delay; notify recipients promptly; post backups on web page

DESIGN OF THE DIGITAL TOC INTEGRATION GUIDE

The Digital TOC Integration Guide (DTIG) was designed to be used by battle staffs and by trainers responsible for observing battle staffs and guiding feedback sessions after collective exercises (Leibrecht et al., 2004b) . The DTIG was designed to be used at both brigade and battalion level, with notations made to identify activities applicable only to brigade.

Due to the fact that the identify and features of digital systems available to battle staffs are continually changing, the team had to decide whether to provide guidance that is independent of specific systems to increase its longevity or to mention specific systems to make the guidance be more concrete. The team selected a middle of the road approach where references to specific systems are provided in the context of an explanation of what the unit is trying to accomplish.

The team organized the DTIG into four major topics; Common staff responsibilities that support BOS integration, establish and maintain the COP, manage digital information, and apply situational understanding to avoid fratricide. Within each topical area, the guidance is arranged by BOS with descriptions of how different staff sections can work together to support the BOS. This approach was somewhat controversial in that certain reviewers suggested it would be better to organize the information by staff sections rather than BOSs. The team felt the organization into major topic areas was more conducive to integration.

Table 7 provides examples of the guidance provided by the DTIG. Digital skills and their tactical value are presented in the first column. The second column describes digital activities indicative of the skill, and the third column suggests ways of finding how well a unit did in terms of applying the skill. The first and second columns may be used by unit members as guidance for how to use digital systems. All three columns may be used by digital trainers.

The team is currently modifying the DTIG in response to changes in digital systems and feedback from digital SMEs. This modification is providing information about the longevity of this guidance. Table 7 can be used to illustrate what we have learned. The items in the first column tend to be independent of specific systems. Many of the items in the middle and right column are likely to endure over time, but some are too specific. For example, the team specified a particular mechanism for ensuring battle staffs display intelligence requirements and decision points (i.e., using the Information Tracker display within MCS-L) but some units manage to display intelligence requirements and decisions points in a high profile manner using commercially available software.

Table 7. Excerpt from Digital TOC Integration Guide

Integration Skill / Tactical Value	Staff Responsibility / Digital System	How to Monitor Staff Actions
Use techniques to reduce time required to prepare digital overlays and make sure overlays are readily available to all BOSs and echelons (ready and findable)	◄ **Maneuver BOS: S3 Ops, S3 Plans, S3 Tactical Admin Center (TAC)** ►	
	• Use "*Shared Out*" (MCS-L) to simultaneously view and build an overlay; designate "Master" and map a drive to Master prior to overlay build • ·Create overlays in Common Tactical Picture software (MCS-L) using designated map scale, save on *Overlay Explorer* area· • Save time building overlays by creating "*user palette*" in the *Draw Function* for your frequently used graphics and symbols (MCS L)· • Send overlays to designated folder (MCS-WS), notify staff via free text message • Map a drive from the SUN PCI application on the MCS-WS to the Web Browser and list needed map drives in TACSOP/TOCSOP, ex. \\localhost\h\M4OPDT\data\oplans	***Query Warfighters:*** • ·Ask staff how information is managed for ease of retrieval (*Recall Map* area, web site, *Shared Out*, designated folder).· • Does TACSOP/TOCSOP specify naming conventions and folder setup? • Do users know how to work on the same overlay file at once? • Does TACSOP/TOCSOP cover filter settings on how to tailor them for the mission, enemy, time, terrain, troop, and civilian (METT-TC) situation? ***Observe Platform/LSD Data:*** • Are there noticeable COP differences between TOCs?
Use digital synch matrix to ensure critical information grabs the unit's attention	• Build Synch matrix on *Information Tracker* (MCS-L) • Post CCIR, PIR, DP, FFIR, and Synch Matrix utilizing *Information Tracker* (MCS-L) and export that information to an Excel Spreadsheet to be used as part of a plan· • Assign responsibility (to Battle Captain or S3) for monitoring and reporting *Information Tracker* events (MCS-L) • Monitor CCIR, PIR, DP, FFIR, and Synch Matrix utilizing *Information Tracker* (MCS-L)	***Query Warfighters*:** • Who is designated to watch for DP, CCIR, and PIR ***Observe Platform/LSD Data:*** • Does the Command Information Center Large Screen Display (LSD) display *Information Tracker*? • Does *Information Tracker* display CCIR, PIR, DP, FFIR, and Synch Matrix simultaneously? • Does Battle Captain or S3 monitor events and advise the Cdr, or do events occur without Cdr being notified?

SUMMARY

The application of networked command and control systems by battle staffs adds substantially to the workload of trainers for collective exercises. The objective of the effort described in this paper was to develop guidance that trainers can use to provide units with feedback regarding their employment of digital systems without detracting from feedback on unit tactical performance. This objective was addressed, in part, by using a variety of methods to identify the potential tactical benefits of employing digital systems (e.g.., addressing frequently occurring problems in the performance of units and supporting BOS synchronization processes). Battle staff actions required to reap these benefits were then identified. and addressed in the guidance provided for trainers.

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