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A Practical Guide for Exploiting FBCB2 Capabilities

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Simulator Systems Research Unit
U.S. Army Research Institute for the Behavioral and Social Sciences

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This document provides two products developed to support performance feedback regarding unit employment of the platform-based digital command, control, and communication system known as Force XXI Battle Command Brigade and Below (FBCB2). The Leader's Primer for Exploiting FBCB2 describes twenty-two major FBCB2 capabilities, the tactical significance of each capability, the digital operator and user tasks involved in employing each capability, the probability that the capability is being exploited, and the evidence that the capability is not being exploited. The FBCB2 Exploitation Tool identifies fifty digital performance goals and the tactical significance of each goal . The tool identifies the echelon(s) to which each goal applies, the trigger events that call for observation of unit performance relevant to the goal, and guidance regarding where to obtain the data needed to assess unit performance. Data are obtained by using one or more of the following mechanisms: observing information on an FBCB2 system: viewing breakouts of message traffic; viewing breakouts of user interactions with systems; and asking questions of warfighters.

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Personnel Performance and
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FOREWORD

Information age warfare challenges warfighters to exploit the powerful capabilities of advanced digital systems. In training to achieve digital proficiency, unit leaders and trainers need tools that help them focus on systems-enabled skills contributing significantly to tactical performance. In support of the digitized force, the U.S. Army Research Institute for the Behavioral and Social Sciences' Simulator Systems Research Unit (SSRU) investigates training and performance assessment needs. The SSRU assists III Corps' Battle Command Training Directorate and the Program Executive Office for Simulation, Training and Instrumentation (PEO-STRI) by developing performance measurement methods and tools for exploiting digital capabilities.

The two products contained in this document were developed to provide trainers with guidance on how to evaluate unit employment of the Force XXI Battle Command Brigade and Below (FBCB2) system in a unit mission context. The guidance emphasizes unit exploitation of FBCB2 to support tactical operations. These products were prepared in response to a request from the Chief of the III Corps G3 Battle Command Training Branch. Laminated, pocket-sized copies of the products were distributed to the 4th Infantry Division in time to support the unit's deployment to Operation Iraqi Freedom. Copies of the booklets were later distributed to the 1st Cavalry Division and to those divisions with Blue Force Tracker systems involved in Operation Iraqi Freedom.

The results of this work were briefed to III Corps' Battle Command Training Directorate at Fort Hood, Texas on 22 November 2002 and again on 29 January 2003.

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Acting Technical Director

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A PRACTICAL GUIDE FOR EXPLOITING FBCB2 CAPABILITIES

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A PRACTICAL GUIDE FOR EXPLOITING FBCB2 CAPABILITIES

INTRODUCTION

This report presents two useful products that can help digital units get the most out of the Force XXI Battle Command Brigade and Below (FBCB2) capabilities. The products focus on high-payoff user skills and tasks that contribute critically to unit combat effectiveness at battalion and below. Table 1 gives a thumbnail overview of the products.

Table 1

Overview of Products for Exploiting FBCB2 Capabilities

Product	Target Audience	Emphasis
Leader's Primer	• Digital leaders, Plt thru Bn • Unit training managers • Unit trainers and evaluators • Training support personnel	• High level orientation • Major FBCB2 capabilities • Key enablers for tactical success • Digital performance pitfalls
Exploitation Tool	• Unit leaders and planners • Unit trainers and evaluators • FBCB2 operators and users • AAR leaders and facilitators • Training support personnel	• Detailed critical task information • Tactical importance, task-by-task • Proficiency targets, by echelon • When/where to get performance data • Digitally focused AAR questions

Both products result directly from the *FBCB2 Training Feedback Variables* project conducted by the U.S. Army Research Institute (ARI). As part of ongoing research, ARI's Simulator Systems Research Unit developed the products to help unit leaders and trainers optimize digital training exercises. The research team built the products around the digital knowledge and experience of leaders and soldiers in the 4th Infantry Division (4ID), the Army's First Digitized Division. Importantly, the tools apply to general functions that are not tied to a specific FBCB2 software version.

This work is part of the "Methods and Measures of Commander-Centric Training" Science and Technology Objective (STO). The goals of this STO are to develop and assess command, control, communication, computers, intelligence, surveillance, and reconnaissance (C4ISR) training methods for Future Combat Systems (FCS) Units of Action, by 2005. This STO supports:

- the U.S. Army Training and Doctrine Command (TRADOC),
- the Program Executive Office for Simulation, Training, and Instrumentation (PEO STRI)
- the Project Manager for Future Combat Systems (PM FCS)

Background

The U.S. Army is in the middle of fielding the Army Battle Command System (ABCS), a family of digital command, control, communications, computers, and intelligence (C4I) systems offering substantially improved warfighting capabilities at every echelon. Within the ABCS family the FBCB2 is the workhorse tool for elements at battalion echelon and below. Effective combat performance depends heavily on realistic training to enable warfighters to fully exploit the capabilities of the FBCB2. Such training requires valid tools for measuring both individual and collective proficiency on digital tasks.

Leaders and trainers need to know how well individuals and teams are operating their FBCB2 systems and using the available capabilities and information. They need criteria and procedures for measuring digital proficiency. Army training developers have yet to fully incorporate detailed digital proficiency criteria in mission training plans (MTPs). In the interim, units have relied on practical experience and their own insights to develop digital proficiency. Assessment of digital performance has centered around the individual warfighter's basic knowledge and use of the system, not the understanding of the application as a combat multiplier.

Among the major FBCB2 functional capabilities, many serve as notable combat multipliers. The digital combat multipliers link to high-payoff skills, contributing significantly to tactical performance. Some of these skills may apply to a particular echelon or mission, while others may apply to all. The products of this project defined measurable targets by echelon for high-payoff skills in order to assess digital proficiency. These proficiency targets should apply across time and should contribute most effectively to achieving digital training objectives. The products represent the first step toward standardizing the measurement of how well units apply digital skills to enhance combat effectiveness.

Digitization can overwhelm trainers and observer/controllers (O/Cs) with observation requirements. In addition to observing the same events that apply to analog units, O/Cs for digitized units must monitor C4I system usage and messaging, interactions between operators and digital systems, and even interactions between system operators and digital information users. The high-payoff proficiency targets spelled out in the Leader's Primer and Exploitation Tool can help trainers and O/Cs focus their attention, knowing the targets contribute significantly to warfighting effectiveness. Focusing on high-priority digital tasks can help avoid observation overload.

In Fort Hood's Battle Command Training Center (BCTC) and Fort Lewis' Mission Support Training Facility (MSTF), trainers and O/Cs routinely face the challenges of measuring digital proficiency levels, and their ranks are growing across the Army. An important benefit of the Exploitation Tool is to reduce O/Cs' workloads to manageable levels by focusing their attention on high-payoff measurement targets. In effect, the tool will enhance the efficiency and effectiveness of the assessment process underpinning digital training. Ultimately this will enhance the payoff units receive from their digital training programs—leading to heightened combat effectiveness.

Development Approach

The project's development strategy leveraged the experience accumulated by Fort Hood units participating in the Army's Force XXI digitization efforts. The investigators gathered knowledge from 4ID leaders and soldiers and from subject matter experts (SMEs) with recent digital experience. Additionally, opportune monitoring of digital exercises in the Close Combat Tactical Trainer (CCTT) and BCTC helped validate and supplement the data.

Leader's Primer

The team developed a concise inventory—the Leader's Primer—to portray what it means to fully exploit critical FBCB2 capabilities. After drafting a list of system functional capabilities, SMEs interviewed 4ID warfighters (brigade and below) about the importance of each capability for successful tactical operations. Team members compiled and organized the results into a matrix of major capabilities, containing the following elements for each capability: keys to success (implementing actions), probability of exploitation (based on estimated frequency of usage), exploitation pitfalls (common performance deficiencies), and evidence pointing to the pitfalls. The team coordinated with 4ID leaders and operators to obtain informal validation of the matrix, which was refined by incorporating their feedback.

Exploitation Tool

The team developed a user-friendly Exploitation Tool to focus assessment activities and facilitate high-payoff performance feedback. Relying heavily on 4ID interview data, SMEs expanded the major FBCB2 capabilities identified for the Leader's Primer and ranked them to determine those contributing most to combat effectiveness. The SMEs next translated the capabilities to produce a list of essential user tasks, and then organized the tasks into nine global skills. The set of major user skills offered the highest payoff for tactical performance, thus warranting the attention of leaders and trainers. The SMEs prioritized the skills based on warfighter input, then obtained verification by 4ID leaders and operators.

For each major skill, the team next developed detailed observation guidelines. The SMEs inventoried specific digital actions (performance goals), applicable echelons, conditions prompting performance (triggers), and relevant sources of performance data. The team compiled the results in a matrix format designed for easy use by leaders, O/Cs and trainers. They coordinated the draft guidelines with 4ID warfighters and then refined them. An overview was added to serve as a roadmap and highlight the tactical importance of digital tasks. The final Exploitation Tool spelled out instructions for when, where, how and why to collect critical performance information.

LEADER'S PRIMER FOR EXPLOITING FBCB2

Appendix A contains the complete Leader's Primer. The primer evolved in two stages—identification of major FBCB2 capabilities as they relate to tactical importance, followed by description of exploitation enablers as well as pitfalls.

FBCB2 Capabilities

As the primary digital tool for small units, FBCB2 brings to battle command elements and maneuver platforms a host of functional capabilities centering around command, control, and communications. The team's analysis plus input from the 4ID warfighters revealed more than twenty major capabilities falling in five operational areas, as seen in Table 2.

Table 2

Inventory of Major FBCB2 Functional Capabilities

Area	FBCB2 Capabilities
Digital Basics	Establish proper communication network
	Clear queues and logs
	Set filters and respond to alerts
	Use filing/naming conventions
	Perform maintenance and troubleshooting
Battlefield Visualization	Relate threat to own/unit location
	Tailor situational awareness (SA) picture
	Manage Red icons
	Post obstacle overlays
Mission Planning & Preparation	Apply Line of Sight (LOS) tool for terrain analysis
	Apply LOS tool for perimeter defense planning
	Use FBCB2 to plan and control fire support
	Use FBCB2 to support logistical planning/preparation
	Construct and update overlays
	Leverage FBCB2 in multi-echelon wargaming
Information Exchange	Prepare and manage messages and graphics
	Disseminate messages and graphics
	Confirm reception of critical messages
Mobility & Maneuver	Use FBCB2 to plan and execute movements
	Leverage FBCB2 in maneuver decisions
	Exploit FBCB2 in fratricide prevention

The FBCB2 capabilities in Table 2 represent both operator and user domains. Some of the functional features (e.g., setting filters, clearing queues and logs) are performed by system operators. On the other hand, the majority of the functional features are orchestrated by users (battle captains, for example) and encompass a family of specific actions. All of the capabilities involve harnessing multiple FBCB2 features to accomplish functional performance requirements.

The capabilities listed in Table 2 represent those FBCB2 features that play a major role in successful tactical operations of the 4ID. Considering operational variations across time and units, the list may need to be modified for other units and environments. At the same time, the inventory provides a reasonable snapshot of the more valuable FBCB2 capabilities supporting Force XXI operational requirements. The inventory provided the springboard for developing the actual Leader's Primer.

The Leader's Primer

The matrix format of the Leader's Primer appears in Table 3. The entries in the "FBCB2 Capabilities" column come directly from Table 2. The "Keys to Success" represent critical enablers for effective digital operations. "Probability of Exploitation" is based on SME estimates of 4ID usage rates and is intended as a potential indicator of underutilized capabilities. "Exploitation Pitfalls" describe performance deficiencies commonly associated with each capability. The "Says Who?" column summarizes primary evidence for the pitfalls. The complete Leader's Primer is found in Appendix A.

Table 3

Format of the Leader's Primer

FBCB2 Capabilities— Tactical Importance	Keys to Success	Probability of Exploitation Bn—Co/Plt	Exploitation Pitfalls	Says Who?
Establish commo network — so Blue picture is complete	• Radios have correct COMSEC • All servers are operational • BLUFOR icons are visible	High----High	Leaders/operators at all echelons fail to establish fully functional network	Field Svc Reps are often called to "fix" simple problems
Post obstacle overlays — to avoid Blue attrition	• Overlays are disseminated • Users post overlays promptly • Overlays are updated	High-----Low	Co/Plts lose warnings by failing to post obstacle overlays	Blue vehicles enter minefields in NTC rotations and FTXs

The "Probability of Exploitation" column projects how often a leader might expect to observe the various capabilities, based on estimated usage rates for various echelons in the 4ID. The team's SMEs reached consensus on the estimates, in light of their own knowledge plus warfighters' interview comments.

FBCB2 EXPLOITATION TOOL

Appendix B contains the complete Exploitation Tool. This product evolved in three stages: (a) identification of high-priority FBCB2 user skills and tasks, (b) development of detailed exploitation guidelines, and (c) preparation of an overview emphasizing the tactical importance of each user task.

FBCB2 User Skills and Tasks

Table 4 presents the set of high-priority digital skills and tasks eventually used to structure the Exploitation Tool. Basically a translation and expansion of the major FBCB2 capabilities from Table 2, the user tasks column pools extensive input from 4ID warfighters. Further, 4ID leaders and operators verified and prioritized the nine global user skills.

Table 4

High-Priority FBCB2 User Skills and Tasks

User Skills	Essential User Tasks
1. Perform Precombat Checks and Inspections	• Perform digital commo check • Verify correct COMSEC files in use • Clear queues and logs • Diagnose problems at lowest feasible level • Verify Blue icons on FBCB2 display • Maintain awareness of # vehicles reporting on TI • Determine % FBCB2s reporting on TI • Send critical messages only when comms in place • Verify completeness of COP • Report gaps in Blue SA
2. Disseminate and Manage Messages and Graphics	• Verify address groups • Apply FBCB2 to react rapidly to new mission • Use standard file naming conventions • Proactively manage planning process • Reduce staff planning time (1/3-2/3 rule) • Disseminate orders and graphics on first try • Ensure 100% dissemination of digital graphics • Use LOS tool to create sector sketch/fire plan
3. Plan and Execute Movements	• Plan/wargame COAs using FBCB2 capabilities • Select routes using Navigation and LOS tools • Check filters for audio and visual alerts • Navigate safely and accurately using FBCB2 • Conduct breach operations using FBCB2
4. Apply Situational Understanding in Maneuver Decisions	• Post danger zones on operational graphics • Use FBCB2 graphics and SA to maneuver • Apply FBCB2 in tracking and reporting CCIR • Apply SU in tracking decision points • Use FBCB2 to decide when to deny fires

5. Conduct Collaborative Planning	• Wargame using digital systems in TOC • Disseminate latest overlays via MDL • Perform digital rehearsal
6. Support Logistical Preparations Unit-Wide	• Disseminate CSS overlay with OPORD • Perform digital CSS rehearsal • Send up CTIL-based LOGSTAT • Send up PERSTAT per TACSOP • Use FBCB2 to determine logistical status of unit • Utilize Supply Point icon • Use Navigation Tool or SA for resupply missions
7. Control Indirect Fires	• Properly route CFFs to supporting AFATDS • Use pre-planned CFF linked to Quick Send
8. Avoid Fratricidal Situations via Situational Understanding	• Disseminate and update obstacle overlay • Perform Net Join • Create manual icons • Apply Spot reporting and handoff procedures • Maintain command awareness of platforms on TI
9. Employ Filter Settings to Create Common or User-Desired Picture	• Use collapse/expand function • Achieve desired operating picture • Use Center of Mass function

The user skills in Table 4 were driven primarily by 4ID operational mission requirements, not by the organization of FBCB2 capabilities. Thus the skills should link closely with mission essential tasks as encountered in a Force XXI unit. This important linkage enables the skills to serve as a valid foundation for developing digital proficiency targets.

The "top nine" FBCB2 skills with their associated user tasks formed the cornerstone for developing detailed guidelines for the Exploitation Tool.

Detailed Exploitation Guidelines

The matrix format of the FBCB2 exploitation guidelines (see Table 5) is designed for easy reference and tracking by digital O/Cs and trainers. For the complete matrix of detailed guidelines, see Appendix B. For each of the nine high-priority user skills (from Table 4), the matrix contains four columns of practical information:

- Performance goals corresponding to the essential user tasks appearing in Table 4 and pointing to fairly specific system-oriented steps.
- The echelon(s) to which each performance goal applies—battalion and below for this project.
- Trigger information specifying the timeframe or condition(s) normally prompting the specified performance.
- Sources and procedures for obtaining relevant performance data.

The various sources of digital performance data include (a) digital message traffic (as viewed on system displays), (b) user-system interaction (as observed in real time), (c) platform status or usage (as examined on system displays), and (d) self-reported performance of digital

actions (warfighter responses to questions). Altogether, the guidelines provide concise instructions on what performance data to collect and when, where and how to collect it.

Table 5

Matrix Format of FBCB2 Exploitation Guidelines, with Sample Entries

Skill	Performance Goals	Echelon	Trigger	Where to Find Data
Perform Precombat Checks and Inspections	Perform digital commo check to ensure network integrity	• Company • Platoon • Platform	Before mission start	**View message traffic data to see if:** • Free text messages are sent bottom-up **Query Warfighters:** • Ask users and operators when/how actions took place
	Clear queues and logs to speed up refresh rate	• Battalion • Company • Platoon	Prior to new mission	**Observe user-system interaction:** • Confirm clearing actions by operators **Observe platform data:** • Monitor system refresh rate on key platforms

The exploitation guidelines are meant to focus proficiency assessment activities and facilitate high-payoff performance feedback. They can be used to (1) guide leaders assessing the digital proficiency of their units, (2) assist trainers planning and preparing for digital training exercises, (3) relate battlefield shortfalls to lack of FBCB2 employment, and (4) help exercise O/Cs plan and execute their measurement activities.

During the course of the project, the draft guidelines were used during battalion training exercises in CCTT. The limited feedback indicated the format and contents are well-suited for operational training. The matrix encapsulates what-where-when-how guidelines in a concise, easy-to-use package that fits all echelons and missions at battalion and below. As a process guide, it fosters insight and resourcefulness on the part of O/Cs. As a commander's assessment tool, it offers a systematic framework for training to a level of digital proficiency that enhances combat effectiveness.

Overview of the Tool

The final component of the FBCB2 Exploitation Tool is the overview that doubles as a table of contents (see Appendix B). The overview lists user skills and performance goals in a compact format. An important feature of the overview is its operationally focused explanation of why each performance goal is tactically important. This information can help leaders explain to subordinates why it is essential to fully use the capabilities of their FBCB2 systems.

GUIDELINES FOR LEVERAGING THE PRODUCTS

A variety of personnel involved in unit training can use both products as planning tools and job aids, depending on their specific needs. The Leader's Primer is useful mainly to help plan and prepare for training exercises. In addition to supporting exercise planning and preparation, the Exploitation Tool can serve as a job aid during execution of exercises. After the exercise is completed, leaders can use the Primer to determine if tactical shortfalls could have been avoided with the proper employment of FBCB2. Table 6 summarizes the guidelines for leveraging the FBCB2 Leader's Primer and the Exploitation Tool.

Table 6

Guidelines for Leveraging the FBCB2 Exploitation Products

Who	When	Why
Leader's Primer		
• Digital leaders, Plt thru Bn	• Assessment, planning	• Determine digital training needs
	• Post-exercise assessment	• Relate tactical errors to digital proficiency
• Unit training managers	• Exercise planning	• Map training needs to objectives
• Unit trainers and O/Cs	• Exercise preparation	• Emphasize indicators of success
• Training support personnel	• Exercise preparation	• Plan realistic exercise support
Exploitation Tool		
• Unit leaders and planners	• Assessment, planning	• Select/prioritize training objectives
	• Exercise execution	• Monitor digital performance
• Unit trainers and O/Cs	• Exercise preparation	• Prepare observation plan and tools
	• Exercise execution	• Manage data collection activities
• AAR leaders and facilitators	• Exercise preparation	• Plan AAR/feedback procedures
	• Exercise execution	• Focus AARs on digital tasks
• FBCB2 operators and users	• Exercise preparation	• Guide pre-exercise training
• Training support personnel	• Exercise execution	• Optimize exercise support activities

Leaders of battalions and subordinate units as well as personnel involved in unit training (e.g., training managers, exercise O/Cs) can use the Leader's Primer as a self-development tool and job aid. It offers a broad-brush orientation to leaders newly assigned to digital units. It can help leaders at multiple echelons determine whether their unit is trained or untrained on critical FBCB2 tasks. It helps leaders relate exercise shortfalls to lack of digital employment. It provides a framework for leaders and training managers to zero in on high-payoff FBCB2 performance targets and training objectives. Unit trainers and O/Cs can use the primer to determine realistic indicators of digital proficiency. Training support personnel (e.g., controllers, roleplayers) can use the keys to success to better plan their exercise support activities. The primer's description of common performance deficiencies can help units recognize and avoid readiness-limiting pitfalls.

The Exploitation Tool complements the Leader's Primer but is primarily for lower echelon application. It can be used for planning, preparing and executing digital training

exercises. Unit leaders and planners can apply the detailed guidelines to identify critical FBCB2 tasks that will enhance tactical performance. Trainers and O/Cs of unit exercises can use the detailed guidelines to better prepare their observation plans/tools for virtual, constructive and live exercises. In general, however, obtaining performance data is easier in simulation exercises. Operators and users of the FBCB2 can identify individual and collective skills that need practice before an exercise starts. Controllers, roleplayers, and other support personnel can use the tool's performance goals to keep their exercise support activities tuned to exploiting FBCB2 capabilities. After the exercise it can point leaders and O/Cs to digital skills that, if employed, would have contributed to the success of the task or training objective. For example, if fratricide occurs during an exercise, leaders and O/Cs could review the digital skills as a guide to what operators should implement to avoid fratricide. They can determine if the lack of proficiency in those skills was a contributing factor in the fratricide. Finally, leaders can use the detailed guidelines to help determine where the unit's TACSOP needs to be updated or expanded.

Facilitators of AARs can use the Exploitation Tool's warfighter queries to focus the training audience on digital tasks and how they contribute to combat effectiveness. The typical AAR following a digital exercise concentrates on how the unit performed tactically, not how well the unit applied the digital tools in support of the mission. The tool's pinpoint queries can keep the AAR process anchored on the digital aspects of the operation (as needed).

The Exploitation Tool's high-priority user skills, with their informal validation by 4ID warfighters, set the stage for focusing digital training objectives and the associated proficiency targets. The consensus ranking provides a loose framework for prioritizing various proficiency targets, but the ranks should be interpreted with professional judgment and common sense.

The potential benefits of leveraging both products are significant. Among the projected benefits are the following:

- More accurate and realistic assessment of digital units' training needs, based on how well they exploit FBCB2 capabilities.
- More rapid orientation of leaders and operators newly assigned to digital units.
- Enhanced effectiveness and payoff of digital training programs, with ultimate improvement in tactical performance.
- Saving of training resources, through more efficient utilization of collective exercises and support personnel.
- Greater return from exercise evaluation resources, with a concurrent reduction of O/C workload.
- Sharing of hard-won warfighter knowledge and insights, to preserve and disseminate invaluable information.

By emphasizing high-payoff proficiency targets in the hands of leaders and trainers, the Leader's Primer and the Exploitation Tool help units get the greatest return from their digital training exercises. In the process they help O/Cs work smart and manage a potentially overwhelming workload.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Measuring digital skills proficiency is essential if units are to achieve the performance potential of advanced C4I tools. The FBCB2 Leader's Primer and Exploitation Tool are practical resources for assessing how well individuals and units are exploiting their digital capabilities. Both products advance the state of the art for measuring digital proficiency, helping leaders and trainers to focus their efforts on high-payoff skills.

Both products are streamlined and user friendly. The Leader's Primer shines a spotlight on major FBCB2 capabilities and keys to operational success. The Exploitation Tool enables convenient referencing and tracking of critical user tasks, with detailed instructions for collecting performance data. Both can be used to assess a unit's digital proficiency, improve digital training, enhance measurement and feedback processes, and focus/manage O/C workloads.

The Leader's Primer and Exploitation Tool are expected to directly benefit digital units throughout the Army as well as their training support elements. The projected benefits should combine to enhance the payoff from digital training programs, boost tactical performance, avoid exploitation pitfalls, and save training resources.

Recommendations

The authors offer the following recommendations for Army leaders, training proponents, senior training managers, and training researchers:

- Designate an appropriate organization as the proponent for digital proficiency assessment tools.
- Institutionalize and disseminate the FBCB2 Leader's Primer and Exploitation Tool so they can be leveraged in digital training environments.
- Maintain and improve both products as new information and technologies become available.
- Determine the suitability and utility of the 4ID-based Leader's Primer and Exploitation Tool for use in other units.
- As necessary, tailor both products to make them fully suitable for other units and operating environments.

The two proficiency-focused products can be used to tailor digital training, enhance the efficiency and effectiveness of training exercises, and boost the overall payoff of future training programs. Harnessing the power of the products can contribute significantly to the tactical performance and combat readiness of FBCB2-equipped units.

APPENDIX A: LEADER'S PRIMER FOR EXPLOITING FBCB2

February 2003

U.S. Army Research Institute

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HOW DO I EXPLOIT FBCB2 TO ACHIEVE COMBAT SUCCESS?

➡ Use this chart to —

- Zero in on high-priority FBCB2 capabilities
- Explain why digital skills are tactically important
- Know what to look for as indicators of success

Major capabilities— Tactical importance	Keys to Success	Probability of Exploitation Bn----Co/Plt	Exploitation Pitfalls	Says Who?
	☙ DIGITAL BASICS ❧			
Establish proper communication network — so Blue picture is accurate	• SINCGARS/EPLRS have correct COMSEC • EPLRS and CSMA servers are operational • All INCs are operational • Digital commo checks are part of PCCs/PCIs • All FBCB2 platforms are reporting on TI • BLUFOR icons are visible on FBCB2 display	High----High	Leaders and operators at all echelons fail to establish a fully functional network, often without realizing it.	Field Service Reps report they are often called to "fix" simple problems (cables not connected, systems not turned on, etc.).
Clear queues and logs — to avoid frustration of sluggish systems	• Queues and logs are cleared prior to LD • Refresh rate is optimal at start of mission • Queues & logs are cleared after each mission • User detects slowdown and takes action • Users know when it's time to clear queues/logs	Med----Low	Co and Plt do not initiate clearing, due to fear of losing info or lack of time. Operators call 31U when system slows down.	Field Service Reps note 31U's frustration at being called to "fix" systems that aren't broken.
Set filters and respond to alerts — enabling better SU and faster decisions	• TACSOP specifies filter setting procedures • Filters are set in advance, according to mission • Filter settings produce clear, standard COP • Filter settings enable hazard alerts • Users respond to alerts with appropriate action • Users adjust filter settings as necessary	Low----Low	Users at all echelons fail to achieve standard COP, often without realizing the significance of the COP. Alerts are filtered out or ignored. Vehicles enter minefields.	In interviews soldiers are unaware of SOPs for setting filters. Some say "Once my system is up I don't touch it."
Use file naming conventions — to retrieve critical info faster	• TACSOP specifies file naming conventions • Order & overlay names are assigned per SOP • Folders are created IAW mission • Folders are identified with DTG • Files are saved in correct folder • Users retrieve and post correct files readily	Low----Low	Users are unsure how to set up folders and name files, due to lack of SOPs or training. They find it difficult to find correct files, and may display incorrect overlays.	In interviews soldiers are unaware of SOPs for creating folders and naming files. Some say it takes too long to find the right file.
Perform maintenance and trouble-shooting — to sustain continuous communications	• Operators or users detect problems promptly • Diagnostic tools (Help, SysAdmin) are used • Prompt action avoids lengthy downtime • Users call 31Us only when all else fails • Workarounds are used infrequently	Low----Low	Operators fail to use trouble-shooting techniques, due to lack of training or time. Users call support personnel unnecessarily.	Field Service Reps report they are often called to "fix" user-level problems (cables not connected, systems not turned on, etc.).

Major capabilities—Tactical Importance	Keys to Success	Probability of Exploitation Bn—Co/Plt	Exploitation Pitfalls	Says Who?
BATTLEFIELD VISUALIZATION				
Relate threat to own/unit location — to protect Blue forces and dominate enemy	• CCIRs are disseminated to lowest echelons • Users report CCIRs as they are encountered • Users relate own/unit icons to Red locations • Planned moves are related to Red assets • All platforms display obstacle overlays • Blue forces avoid danger zones	High----Med/Low	Below TF TOC, leaders fail to monitor CCIRs. Co/Plt view Red picture but fail to analyze risk to their operations. Blue vehicles enter danger zones.	Field observations and interviews reveal Co/Plt ldrs lack proficiency to assess how enemy can disrupt Blue operations. Avoidable attrition reinforces this.
Tailor SA picture — to enhance decisions thru better SU	• BOS-based filtering clarifies SA picture • Collapse/expand function reduces clutter • BFA drives filters for Red picture • CM function suits logistics elements in offense • Slower Blue update rate suits defense • CM function suits other TFs in reconstitution	Low----Low	Leaders and operators at all echelons fail to tailor SA picture for current operations. Screens become cluttered and hard to follow.	In interviews soldiers are unaware of SOPs for tailoring filter settings. Field observations reveal confusing FBCB2 displays.
Manage Red icons— to enhance threat picture	• TACSOP specifies Spot reporting procedures • Red picture gives insight on enemy forces • Responsibility for updating Red icons is clear • Spot reports are updated as needed • Users question when Red icons become stale • Observer hands off monitoring when necessary	Med----Low	Co and Plt fail to update Red icons and hand off ownership when originator loses visual contact. Red icons fade as they become stale.	Soldier interviews reveal Spot report originators neglect to update Red icons, and SOP for hand-off is lacking.
Post obstacle overlays — to avoid Blue attrition	• Obstacle overlays are disseminated promptly • Users post obstacle overlays promptly • Users name and save overlays properly • Minefield alerts trigger avoidance actions • Engineers are notified of new minefields • Obstacle overlays are updated as necessary	High----Low	Co/Plt lose warnings by failing to post obstacle overlay, or posting old overlay, or failing to find misfiled overlay. Blue vehicles enter danger zones.	In NTC rotations and FTXs, Blue vehicles enter minefields and other danger zones.
MISSION PLANNING AND PREPARATION				
Apply LOS tool for terrain analysis — to enhance Blue Force protection	• LOS tool replaces analog map technique • TACSOP specifies digital terrain analysis role • Inter-visibility estimates are more precise • Outcomes appear in planning products • Vulnerable areas of route are identified quickly • Future engagement areas emerge readily	Low----Low	Leaders and operators fail to use LOS tool for terrain analysis, reverting to analog map recon. Vulnerable areas are overlooked. Likely enemy contact is misjudged.	Operators in interviews state they forget to use the LOS tool during planning and preparation.
Apply LOS tool for perimeter defense planning — to improve speed and accuracy	• Digital sector sketches are the norm • Circular LOS tool is used during planning • Fields of fire are optimized quickly • Placement/coverage of LPs/OPs is verified • Enemy avenues of approach are illuminated • Threat fields of fire are predicted accurately	Low----Low	Units are not leveraging LOS tool for perimeter defense planning. This results in unknown dead spaces and degrades placement of LPs/OPs.	Field observations in TOCs and CPs reveal incomplete sector sketches instead of digitally verified sector sketches.

Major capabilities—Tactical Importance	Keys to Success	Probability of Exploitation Bn—Co/Plt	Exploitation Pitfalls	Says Who?
Use FBCB2 to plan and control fire support — to enhance precision and avoid fratricide	• Digital tools replace analog map techniques • TACSOP specifies digital CFF procedures • CFF requests are planned in advance • Pre-planned CFFs are set in Quick Send queue • Fire support triggers appear on SA displays • SA influences decisions to deny fires	High----Med	Co and Plt leaders typically fail to pre-plan CFFs, leading to delays in execution. Non-use of COP capabilities can allow fratricide situations to develop.	Field observations during digital exercises discover no preset CFFs in Quick Send queues. Decisions to deny fires are seldom influenced by Blue SA picture.
Use FBCB2 to support logistical planning/preparation — to bolster resupply procedures	• Digital CSS overlay accompanies OPORD • Circular LOS tool is used to plan log sites • Digital CSS rock drills are performed • Digital LOGSTATs/PERSTATs are the norm • LOGSTATs are properly routed, reach CSSCS • Supply Point icons are established • Coordination for supplies occurs digitally • Transporters use FBCB2 Nav tool for deliveries • Leaders find support elements via SA picture	Low----Low	CSS annex and overlay are often omitted or disseminated late. Units typically bypass CSS rock drills and struggle with LOGSTAT rollup. Supply point capability is rarely used.	Observation of simulation exercises typically finds no logistics players or logistics planning.
Construct/update overlays — to enhance COP & SU	• Digital overlays are the norm (vs. hardcopy) • Overlays are named IAW standards (TACSOP) • Digital overlays are disseminated via MDL • Complete dissemination occurs on first attempt • Every platform receives obstacle overlay • Users post overlays prior to LD • Overlays are updated as required	High----Low	Dissemination of overlays to Co's and Plt's is often abortive, fractionated or incomplete. Users who do receive overlays often fail to save them properly and post them to the display.	During field observations and interviews, soldiers express frustration with receiving multiple overlays. They don't know how to name and file overlays for easy retrieval.
Leverage FBCB2 in multi-echelon wargaming — to optimize synchronization	• Wargaming routinely involves FBCB2 • COA analysis is related to SA picture • Digital rehearsals occur routinely • Nav tool helps estimate Blue/Red rate of march • Likely exposure to Red weapons is illuminated • Vulnerable areas are identified for BLUFOR • FBCB2 tools influence decision making	Med----Low	Co's and Plt's fail to use FBCB2 for mission analysis. Only partial capabilities of Nav tools are used. Digital rehearsals occur rarely and without strip maps.	Interviews and observations of training exercises suggest digital expertise is not mature enough to support digital wargaming and rehearsals.
TACTICAL INFORMATION EXCHANGE				
Prepare and manage messages/graphics — to facilitate information retrieval	• Users set up message folders during PCCs • Address groups are verified after UTR • Digital OPORDs/overlays are the norm • File names follow TACSOP conventions • Graphics are simple and within size limits • Graphics are updated as required • Users purge files when no longer needed	High----Med	Unit SOPs for folders and file naming are lacking or ignored. File naming and folder structure are not standard across the TF. Purging seldom occurs.	Inspection of TACSOPs reveals lack of guidance for folders and file naming.

Major capabilities—Tactical Importance	Keys to Success	Probability of Exploitation Bn---Co/Plt	Exploitation Pitfalls	Says Who?
Disseminate messages/graphics—to build complete COP	• Orders are disseminated via FBCB2 • Digital overlays are disseminated via MDL • Complete dissemination occurs on first attempt • Users save files in proper folders • Users retrieve information readily • Correct overlays are posted on all platforms	High----Med	Leaders fail to detect incomplete dissemination of messages/overlays. Users fail to save materials properly and have trouble retrieving desired information.	Field Service Reps report problems with retrieving information that result from dissemination and "save" errors.
Confirm receipt of critical messages — to assure complete dissemination	• TACSOP specifies confirmation process • Leaders track message reception status • Recipients send messages verifying receipt • Leaders relay status reports higher • Leaders take action when gaps are discovered • All users have essential messages prior to LD	Med----Low	TACSOPs fail to address confirmation. Critical messages fail to require operator response. Platforms end up missing essential information.	Inspection of TACSOPs reveals lack of guidance for confirming reception of critical messages.
FORCE MOBILITY AND MANEUVER				
Use FBCB2 to plan and execute movements — to increase speed and precision	• Current operational graphics are posted • Current obstacle overlays are posted • LOS and Nav tools are used to select routes • CLOS tool reveals vulnerable areas of route • Hazardous areas and chokepoints are identified • Leaders disseminate route maps as overlays • Leaders confirm reception of route information • Users save route strip maps as overlays • Drivers use route strip maps to navigate • Elements navigate safely, accurately, quickly	High----Med/Low	Lack of wargaming can leave movement problems (choke points, danger zones, etc.) unresolved. Users neither save overlays properly nor post them to the display. Leaders fail to save and disseminate route maps.	Review of TACSOPs reveals lack of guidance for organizing folders, naming files, and disseminating route maps.
Leverage FBCB2 in maneuver decisions — to enhance BLUFOR lethality and survivability	• Leaders control order/rate of march via FBCB2 • SA facilitates formation and dispersion • Leaders track CCIR & decision points via COP • Commander uses SA to cue use of UAV • Geo-reference icons appear in COP • Leaders monitor breaching and river crossing • FBCB2 is used to call for precision smoke • Leaders spot traffic flow problems via SA • FBCB2 influences maneuver decisions	High----Med	Ignoring SA picture degrades control of movement. CCIR and decision points are tracked poorly. Traffic flow problems are detected late.	Interviews and observations of training exercises suggest digital expertise is not mature enough to support tracking of CCIR and linking decisions to FBCB2 capabilities.

Major capabilities—Tactical Importance	Keys to Success	Probability of Exploitation Bn---Co/Plt	Exploitation Pitfalls	Says Who?
Exploit FBCB2 in fratricide prevention — to minimize Blue attrition	• Current operational graphics are posted • Current obstacle overlays are posted • Operators set alert filters properly • Icons appear for non-reporting elements • Users monitor Blue SA regularly • Users respond to alerts with appropriate actions • Elements avoid hazards and danger zones • Leaders use Blue SA to deny fires • Net Join occurs when EPLRS servers fail • S6 periodically checks # systems reporting to TI • Degradation of TI is FFIR	High---Med	Users fail to save and post overlays properly. Users often filter out alerts. Icons for dismounts and recon elements are not entered. TACSOP fails to specify procedures when too few platforms are reporting. Blue vehicles enter hazardous areas.	Review of TACSOPs reveals lack of guidance for saving/ posting overlays, manually entering icons, and restoring sufficient number of reporting platforms.

APPENDIX B: FBCB2 EXPLOITATION TOOL

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U.S. Army Research Institute

For Official Use Only

What Can I Use This Tool For?

- Find critical FBCB2 exploitation tasks that will enhance combat effectiveness
- Understand the tactical value of FBCB2 capabilities
- Determine if the unit is trained or untrained on FBCB2 tasks
- Decide where to assign/delegate specific digital tasks
- Apply FBCB2 in relation to METT-TC
- Determine where the TACSOP needs to be updated or expanded

Where Did This Information Come From?

- Digital warrior interviews (Fort Hood)
- Observation of 4ID training events
- Digital operations SMEs

What's in This Tool?

Leaders and trainers can find *who-what-where* guidelines on critical digital skills —

Skill	Performance Goal	Tactical Importance	Page
Perform Precombat Checks/ Precombat Inspections (PCC/PCI)	Perform digital commo check with Co CP	Ensure all required systems are communicating with Co CP	1
	Perform digital commo check with Bn TOC	Ensure all required systems are communicating with/within TOC	1
	Ensure all systems have correct/current COMSEC	Enable digital systems to communicate, prevent need for workarounds	1
	Clear queues and logs	Avoid slow refresh rate, optimize accuracy and timeliness of COP	1
	Diagnose problems at lowest feasible level	Minimize system downtime, avoid degraded COP, reduce need for workarounds	1
	Verify Blue icons on FBCB2 display	Ensure interface with TI is working, correct any platform problems	1
	Maintain awareness of # vehicles reporting to TI	Ensure proper communication network stays intact, promptly detect problems	2
	Determine % unit FBCB2s reporting to TI	Determine COP's level of accuracy, avoid false confidence	2
	Send critical msgs only when commo checks are complete	Avoid incomplete dissemination of critical msgs, know when workarounds are needed	2
	Verify completeness of COP	Identify problems with tactical picture, account for missing elements	2
	Report gaps in Blue SA to higher and lower HQ	Detect when Blue picture is degraded, cue action to avoid fratricide	2
Disseminate and Manage Messages and Graphics	Verify address groups	Ensure critical messages are disseminated to proper addressees	2
	Apply FBCB2 capabilities to rapidly react to new mission	Enhance tactical agility, speed transition, verify dissemination of information	3
	Use standardized file naming conventions	Ensure match-up of orders and overlays, avoid confusion, facilitate retrieval of files	3
	Proactively manage planning process	Avoid delays in planning, enhance collaboration, cue corrective actions	3
	Reduce staff planning time (1/3 - 2/3 rule)	Increase time available for planning and preparation at lower echelons	3
	Disseminate orders/graphics to all platforms on first attempt	Avoid delays in planning, reduce confusion, prevent fractionation of efforts	3
	Ensure 100% dissemination of digital graphics	Ensure everyone receives commander's intent, cue corrective actions	4
	Take advantage of LOS tool to create sector sketch/fire plan	Ensure fire plans provide adequate coverage, optimize placement of LPs/OPs	4
Plan and Execute Movements	Plan/wargame likely COAs using FBCB2 capabilities	Accelerate COA analysis, reduce uncertainty and risk, identify optimal COA	4
	Select routes using navigation and LOS tools	Reliably identify vulnerable areas and choke points, reduce navigation risks	5
	Check filters for audio and visual alerts	Ensure users receive automatic warnings of danger zones and hazardous areas	5
	Navigate safely and accurately using FBCB2 tools	Improve speed and precision of movement, enhance survivability of Blue elements	5
	Conduct breaching operations using FBCB2 capabilities	Enhance speed and safety, better control order and rate of march, avoid Blue attrition	6
Apply Situational Understanding in Maneuver Decisions	Post known danger zones on platform operational graphics	Maximize awareness of hazards, enable automatic warnings of proximity to dangers	6
	Maneuver with the aid of FBCB2 graphics and SA	Increase confidence and synchronization, enable bold and aggressive maneuver	6
	Apply FBCB2 in tracking and reporting CCIR	Accelerate understanding of Red activities, quickly identify tactical opportunities	7
	Apply SU in tracking decision points (DP)	Make faster/better decisions, reduce uncertainty, enhance agility and lethality	7
	Use FBCB2 in deciding when to deny fires	Reduce risk of fratricide from indirect fire, improve confidence in clearing fires	7
Conduct Collaborative Planning	Wargame using digital systems in TOC	Accelerate decision process, accurately assess vulnerabilities, reduce uncertainty/risk	7
	Disseminate latest overlays via mission data loader (MDL)	Ensure all platforms have up-to-date COP, avoid overloading the TI, standardize COP	8
	Perform digital rehearsal	Optimize synchronization, reduce time required for rehearsals, manage risks better	8

Skill	Performance Goal	Tactical Importance	Page
Support Logistical Preparations Unit-Wide	Disseminate digital CSS overlay with OPORD	Facilitate proactive CSS, better integrate CSS with maneuver, ensure complete COP	8
	Perform digital CSS rehearsal	Save time and travel, identify potential problems early, manage risks better	8
	Send LOGSTAT up thru proper channels, based on CTIL	Ensure ALOC has complete and current picture, optimize refueling and resupply	9
	Send PERSTAT up thru proper channels per TACSOP	Ensure ALOC has complete and current status, optimize personnel replacements	9
	Use FBCB2 to determine logistical status of unit	Enhance awareness of leaders, avoid surprises, cue proactive support	9
	Utilize Supply Point icon	Optimize awareness of tactical supply network, better match supplies with needs	9
	Use navigation tool or SA to execute resupply missions	Enhance speed and precision of resupply missions, avoid loss of resupply vehicles	9
Control Indirect Fires	Properly route CFF to supporting AFATDS	Ensure fire mission requests are processed, avoid missed opportunities	10
	Use preplanned CFF linked to Quick Send button	Accelerate delivery of fires, reduce confusion, avoid missed opportunities	10
Avoid Fratricidal Situations via Situational Understanding	Disseminate and update obstacle overlay	Ensure all platforms have up-to-date picture of Red and Blue obstacles	10
	Perform Net Join	Restore complete Blue SA picture when EPLRS servers fail	10
	Create manual icons	Maintain complete Blue SA picture, avoid mistaking non-reporting elements as enemy	10
	Apply Spot reporting and handoff procedures	Achieve best available Red SA picture, keep information current, avoid lapses	11
	Maintain command awareness of # platforms reporting to TI	Know promptly when COP accuracy is compromised, avoid false confidence	11
Employ Filter Settings to Create COP	Use collapse/expand function	Tailor SA picture to current needs, avoid screen clutter, enhance SU	11
	Achieve desired operating picture	Facilitate SU, accelerate decision making, enhance command and control	11
	Use Center of Mass function	Ensure Blue SA picture is clear and easy to follow, reduce distractors, enhance SU	11

FBCB2 Exploitation — Detailed Guidelines

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
Perform Precombat Checks/ Precombat Inspections (PCC/PCI)	Perform digital commo check with company CP, to ensure proper communication network	Company	Prior to start of mission or UTO change	***View message traffic to see if:*** • Each platform sends free text commo check to Co CP with Machine Acknowledgement (MA). ***View user-system interaction:*** • If no MA is received, what actions are taken? (FM query, troubleshooting?) ***Observe platform data:*** • View CP message sent queue to verify how many MAs were received at the company CP. ***Query Warfighters:*** • How/when did leaders and operators perform digital commo checks (i.e., MA response)?
	Perform digital commo check with battalion TOC, to ensure proper communication network	Battalion Company Platoon	Prior to start of mission or UTO change	***View message traffic to see if:*** • Each Plt Ldr/Plt Sgt sends free text commo check with MA to Bn S3. ***View user-system interaction:*** • If no MA is received by Plt Ldr/Plt Sgt, what actions are taken? ***Observe platform data:*** • View S3 message sent queue to verify how many MA messages were received. ***Query Warfighters:*** • Ask S3 if digital commo check is addressed in TACSOP. • Ask operators and leaders when/how they performed digital commo checks (i.e., MA response).
	Ensure all systems have correct/current COMSEC file, enabling systems to communicate	Company Platoon	Prior to start of mission	***Observe platform data:*** • If a platform or section can only see its own icon, current COMSEC may not be loaded. ***Query Warfighters:*** • Ask about last COMSEC load and compare DTG between platforms and units.
	Clear queues and logs to speed up refresh rate, resulting in more accurate and timely COP	Battalion Company Platoon Operator	When refresh rate slows; at a minimum prior to start of mission	***Observe platform data:*** • Note if system refresh rate is visibly slow. • View message queue to determine last time it was cleared. ***Query Warfighters:*** • Ask commanders and operators when/how often they cleared their queues and logs before and during the mission.
	Diagnose problems at lowest feasible level to minimize downtime and sustain COP	Operator	Operator realizes system is not reporting to TI	***View user-system interaction:*** • User performs troubleshooting to rule out true problems with his system. ***Query Warfighters:*** • Ask support personnel how many failures were operator level. • Ask operators what troubleshooting they performed prior to notifying maintenance personnel.
	Verify own and other Blue icons on FBCB2 display to ensure interface with TI is working	Operator	As needed, at a minimum prior to start of mission	***Observe platform data:*** • View Blue SA to determine if there are gaps. ***Query Warfighters:*** • Ask operators how they know when they are sending and receiving SA data.

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Maintain awareness of how many vehicles are reporting to the tactical internet (TI), to maintain proper commo network	Company Platoon	Prior to start of mission or UTR change	***Query Warfighters:*** • Ask leaders how many vehicles in their Co/Plt are reporting on TI. (Leaders can verify by obtaining MA messages from lower echelons indicating systems are operational.)
	Determine % unit FBCB2s reporting in order to determine if tactical picture is accurate	Brigade Battalion	Prior to start of mission or UTR change	***View user-system interaction:*** • Determine total # of platforms reporting on TI (go to SysAdmin, status under SA tab). ***Observe platform data:*** • Observe COP display to determine if Blue elements are missing (not due to filter settings). • Ask S6 to run Star Office report showing % transmitting or to display listing by URN. ***Query Warfighters:*** • What actions does S6 take to optimize COP?
	Send critical messages only when commo checks are complete, to avoid incomplete dissemination	Battalion Company	Prior to start of mission	***View message traffic to see if:*** • View traffic to make sure HQ does not try to send critical information before digital commo is confirmed. ***Query Warfighters:*** • Ask higher HQ if connectivity was verified prior to mission. If not, what actions were taken to pinpoint and fix the problem? • What is the alternate plan for disseminating information to those platforms not communicating?
	Verify completeness of COP to ensure accurate tactical picture	Company Platoon Platform	As needed, at a minimum prior to new mission	***View user-system interaction:*** • See if operators set Friendly filters properly (METT-TC dependent or as directed by TACSOP) to clarify tactical picture. ***Observe platform data:*** • Compare COP on different company platforms. Is COP similar? • S6 verifies CSMA servers are reporting to TI. ***Query Warfighters:*** • Did operators detect a Blue SA problem? Did they check their filter settings?
	Report gaps in Blue SA to higher & lower HQ, alerting network to degraded COP	Battalion Company Platoon Platform	User realizes Blue picture is degraded (not due to his filter settings)	***View user-system interaction:*** • User performs troubleshooting to rule out problems with his platform (i.e., verifies current COMSEC, verifies EPLRS server is operational, checks filter settings). ***Observe platform data:*** • Did user take the initiative and enter known Blue icons to prevent fratricide? ***Query Warfighters:*** • Was correct COMSEC loaded? • Was notification of any Blue SA gaps made network-wide to avoid fratricide?
Disseminate and Manage Messages and Graphics	Verify address groups to ensure critical messages (CFF, MEDEVAC, etc.) are disseminated to proper addressees	Battalion Company Platoon	UTR change	***View message traffic to see if:*** • Cdr / Plt Ldr sends free text message with Operator Acknowledgement (OA) verifying UTR was accepted. ***Observe platform data:*** • View message sent queue to verify how many OA messages were received by the sender. ***Query Warfighters:*** • Were there any UTR changes? • Did the UTR change(s) affect CFF routing requirements?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Apply FBCB2 capabilities to rapidly react to new mission	Battalion Company Platoon	New mission, orders and graphics	***View user-system interaction:*** • Do users open messages? How much time elapses between receipt and opening? • How many orders/graphics are not opened? ***Query Warfighters:*** • Were unopened orders/graphics overlooked or ignored?
	Use standardized file naming conventions and message folders to facilitate information management	Platoon Platform	New mission or updated graphics	***View user-system interaction:*** • See if users are using and naming file folders properly. • Are overlays, orders, and mission-specific information filed in correct folder? • File naming conventions are used (examine file names as messages are saved). ***Observe platform data:*** • How long does it take users to match graphics with corresponding order? • Are overlays, orders, and mission-specific information filed in correct folder? ***Query Warfighters:*** • Ask users if TACSOP covers message and folder naming conventions. • Ask commanders and crews if they encountered problems identifying the correct overlay or finding information they were seeking.
	Proactively manage planning process to avoid delays and give subordinate echelons more time to plan	Brigade Battalion Company	Receipt of WARNO or FRAGO from higher	***View message traffic to see:*** • How long after staff knows of changed/new mission does it take to send a digital WARNO/FRAGO? ***View user-system interaction:*** • Do operators open WARNO or FRAGO immediately or does it sit in the FIPR queue? ***Observe platform data:*** • Verify time TOC received changed/new mission. How long until TOC issued WARNO or FRAGO? ***Query Warfighters:*** • When was order received? • Were updated or new graphics received quickly?
	Reduce staff planning time (1/3 - 2/3 rule), to increase time for subordinate planning and preparation	Brigade Battalion Company	New mission, orders and graphics	***View message traffic to see if:*** • Each TOC uses less than 1/3 of available time. • Determine time from OPORD receipt at Bde or Bn to receipt at lower echelon; calculate % time used at each echelon. ***Observe platform data:*** • Determine if users received OPORD in timely manner. • In TOC or CPs, determine if correct and mission-relevant overlays are posted on the displays. ***Query Warfighters:*** • Ask if/when MDL was used to load orders/graphics. • How did the staff monitor time?
	Disseminate orders and graphics to all platforms on first attempt, to avoid delays and confusion	Company Platoon	New mission, orders and graphics	***View message traffic to see if:*** • Orders and graphics are received by each platform. • Are the reception times consistent across all platforms in the company? ***Observe platform data:*** • When users fail to receive orders and graphics, determine why (are they on correct UTR, is the correct COMSEC loaded, are they affiliated with an EPLRS server?). ***Query Warfighters:*** • Ask users if and when they received orders and graphics relative to key mission event, such as LD time.

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Ensure 100% dissemination of digital graphics via MDL, to speed planning and achieve COP	Brigade Battalion Company	New mission, orders and graphics	***Observe platform data:*** • See which vehicles are deadlined or out of AO during MDL load (check later to see if vehicle got loaded with correct graphics). ***Query Warfighters:*** • How do leaders track which vehicles received orders and graphics via MDL? • What are TACSOP directions for ensuring complete dissemination?
	Take advantage of LOS tool in creating sector sketch/fire plan within Plt, to ensure adequate coverage	Platoon Platform	Hasty defense or assembly area operations	***View message traffic to see if:*** • Each platform sends sector sketch/fire plan to Plt Ldr. ***View user-system interaction:*** • Determine if each platform employs the FBCB2 Line of Sight (LOS) tool. ***Observe platform data:*** • See if each platform digitally incorporated all assets in fire plan and sent it to Plt Ldr. ***Query Warfighters:*** • Ask Plt Ldr if he received digital sector sketches. • Ask platform commanders if they used LOS tool to prepare sector sketches. • Was LOS tool used for LP/OP emplacement and determining likely enemy avenues of approach?
	Take advantage of LOS tool in creating sector sketch/fire plans from Plt to Co, to ensure adequate coverage	Company Platoon	Hasty defense or assembly area operations	***View message traffic to see if:*** • Each Plt Ldr sends sector sketch to Co Cdr. Cdr consolidates information and passes to higher. ***View user-system interaction:*** • Determine if Plt Ldr creates sector sketch/fire plan and sends it to Co Cdr. • Does 1SG use LOS tool to perform final verification of perimeter coverage? ***Observe platform data:*** • If LP/OP was not digitally equipped, did manual icon get entered? • See if Company CP posted base cluster defense. Review unit TACSOP. ***Query Warfighters:*** • Ask Co Cdr if he received digital sector sketches from each platoon. If so, how was input obtained? • Did the Co Cdr/1SG consolidate information? • Ask Plt Ldrs/Plt Sgts if they used the LOS tool to prepare and verify sector sketches or to set conditions for engaging the enemy.
Plan and Execute Movements	Plan and wargame likely COAs using FBCB2 to reduce risks and uncertainty	Battalion Company Platoon	Receipt of WARNO to move	***View user-system interaction:*** • Observe wargaming to verify leaders and users relate current location to future location, analyzing terrain. They check cover and concealment throughout the move by using the circular LOS (CLOS) tool. • Observe wargaming to verify leaders and users relate threat to proposed movement. • Observe wargaming to verify leaders use NAV tool to determine time-distance factors or estimate time to reach objective. • Did leaders review FBCB2 CDRSITREP to determine logistical health of unit? ***Query Warfighters:*** • How did leaders use FBCB2 to wargame likely COAs? • How did leaders use FBCB2 tools (e.g., SA, CLOS, time distance factors) to estimate enemy contact?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Select routes utilizing navigation and LOS tools, to enhance tactical movement and set conditions for success	Company Platoon	Receipt of OPORD/WARNO	***View message traffic to see if:*** • Co Cdr or Plt Ldr saves route map as overlay and disseminates to platforms. ***View user-system interaction:*** • Verify whether Co Cdrs and Plt Ldrs use FBCB2 navigation and LOS tools. ***Observe platform data:*** • Did Co Cdr send OA message to ensure all Plt Ldrs receive route overlays? • Was information sent to individual platforms? ***Query Warfighters:*** • Ask Co Cdrs and Plt Ldrs how they used FBCB2 to select routes. • Did leaders use CLOS to identify vulnerable areas and to set conditions for engaging the enemy? • Did Plt Ldrs use NAV tool to develop route map? Was it disseminated to platforms as an overlay?
	Check filters for audio and visual alerts so automated warnings of hazards occur	Platoon Platform	Prior to start of mission	***View user-system interaction:*** • Verify default alerts are not turned off. ***Observe platform data:*** • Identify crews that entered hazardous areas. Was the obstacle overlay posted? ***Query Warfighters:*** • Ask crews if they turned off default alerts and if so, why? • What procedure did crews employ and how did they monitor alerts? • Why did Blue forces enter hazardous areas?
	Navigate safely and accurately with use of FBCB2 route map or Drivers Display	Company Platoon Platforms	Convoy operations, night move or limited visibility move	***View message traffic to see if:*** • Co Cdr/Plt Ldr transmits route strip map (overlay) to platforms. ***View user-system interaction:*** • Verify default alerts are not turned off. • See if LOS or NAV tools are employed. • Do users apply Drivers Display waypoints to facilitate movement or do they simply execute a "center on" and drive to location (not recommended for long distances)? ***Observe platform data:*** • Monitor SA to see if elements navigated safely, accurately and quickly. • Were any platforms lost during the move? If so, why? • Was route strip map (overlay) provided? ***Query Warfighters:*** • Ask users how they applied FBCB2 to select routes in limited visibility. • Do Co Cdrs/Plt Ldrs know how to create and disseminate a route strip map? • Do leaders point out vulnerable areas along the route?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Conduct breaching operations using SA, Bridge Report and navigation tool	Battalion Company Platoon	Execution of breaching operations	***View message traffic to see if:*** • After breach lane is complete, Bridge Report is sent indicating location of breach lane. • FBCB2 is used to call in smoke for the breach. ***View user-system interaction:*** • Determine if users check messages to see if Bridge Report is received. • Do users post Bridge Report to mark breach lane on graphics? • Do elements use FBCB2 to navigate through breach lane? ***Observe Platform Data:*** • Monitor COP to see if breach lane is marked with Bridge Report. • If movement is through minefield, is it marked? ***Query Warfighters:*** • Did leaders use SA to determine if all elements were in position to execute Breaching operation? • Ask leaders if they used FBCB2 to navigate through breach lane to avoid traffic jams.
Apply Situational Understanding In Maneuver Decisions	Post known danger zones on platform operational graphics to reduce risk of Blue force attrition	Battalion Company Platoon Platform	Receipt of mission or updated obstacle overlay	***View message traffic to see if:*** • Do engineers use scatterable minefield graphic (vs. minefield icon) for clarity? • Do engineers create a Bridge Report to identify breach lane? • Is obstacle overlay posted? ***Observe platform data:*** • Do proper geo-referenced icons appear on all platforms? • Do fratricides occur? ***Query Warfighters:*** • Ask who was responsible for populating danger zones as geo-referenced icons. • Did any friendly forces enter a reported danger zone? If so, why? (Did users ignore alarms, have alarms filtered out, or ignore their display?) • What danger zones can be posted as a geo-referenced icon on FBCB2? (minefields, NBC contaminated areas, etc.) • Where there any cases where SA information helped you avoid a danger zone?
	Maneuver with the aid of FBCB2 graphics and SA, to increase speed and precision	Battalion Company Platoon Platform	Tactical movement	***View user-system interaction:*** • Do users post most current graphics? • Determine if leaders are using SA to direct maneuver or are reverting back to FM/analog. ***Observe platform data:*** • Did maneuver problems or delays occur because digital tools were not applied? • Monitor voice traffic to see if there are requests for information that could have been addressed by simply looking at SA displays (where are you?) • Monitor radio traffic to see if there are cases where it is apparent that leaders that observed a movement or maneuver problem by observing SA displays ***Query Warfighters:*** • Ask crews if they had the most current operational graphics posted. If not, why? • How do leaders track whether everyone in their unit is using the same version of graphics or whether the graphics they are using are the most recent versions? • Ask leaders if and how digital SA helped them to control maneuver. • Ask leaders how they decided when to look at digital SA data to monitor the movement of their subordinate elements.

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Apply FBCB2 in tracking and reporting CCIR, to accelerate the decision process	Battalion Company Platoon	Observation of enemy forces activity	***View message traffic to see if:*** • OPORD specifies CCIR. • Digital Contact reports, Spot reports, and SITREPs are submitted bottom-up and posted on operational graphics. • Updates are disseminated via FBCB2. ***View user-system interaction:*** • Determine if staff or subordinate elements view Red picture to answer CCIR. • Do planners use time/distance capability in NAV tool when estimating enemy rate of march? ***Query Warfighters:*** • Are leaders aware of higher HQ CCIR? • Ask leaders and staff members how they used FBCB2 or SU to track and report CCIR. • Are lower leaders aware of CCIR in their battlespace?
	Apply SU in tracking decision points (DP) to ensure timely decisions/actions	Brigade Battalion	Activity impacting a DP	***View message traffic to see if:*** • TOC elements receive updated Red picture or other decision-critical information from FBCB2. • TOC disseminates directives via FM, follows up with digital message(s) to lower TI. ***Observe platform data:*** • Do DPs appear on operational graphics? Are graphics posted on platforms? • Monitor battle via SA to see if Cdr is aware or advised when DPs are about to occur. ***Query Warfighters:*** • Ask leaders if DPs were covered during rehearsal. • Did Cdr apply SU in monitoring his DPs? If not, were they visible in the TOC or on FBCB2? • Were units aware their battlespace contained DPs?
	Use FBCB2 in deciding when to deny fires, reducing the risk of fratricide	Battalion Company Platoons Platform	Request for indirect fires in area occupied by Blue forces	***View message traffic to see if:*** • Locations of dismounted or non-reporting elements/civilians are communicated via overlays or manually entered icons. ***View user-system interaction:*** • Are FBCB2 filters set to fit the tactical situation? ***Observe platform data:*** • Are there Blue icons in the area of CFF targets? • Are mission relevant overlays posted? (operational graphics, fire support overlay, and obstacle overlay during maneuver) • Are there cases where friendly or "unknown" elements are not represented by an icon? • Did unit use FBCB2 to clear fires? (***never*** acceptable) ***Query Warfighters:*** • Ask crews when they used FBCB2 to decide not to engage. • How did crews track locations of dismounts, non-reporting Blue forces, dislocated civilians or joint forces? (Position Report function, overlays, manual icons) • Ask leaders when they checked their SA displays regarding the location of friendly forces (just before shooting or requesting fire? Periodically when time was available? Etc.?)
Achieve Battlefield Dominance through Collaborative Planning	Wargame using digital systems in TOC, to enhance decision making process	Battalion	As needed to support MDMP	***View user-system interaction:*** • Observe wargaming. Verify all BOS elements participate in wargaming. • Do leaders relate friendly assets to enemy situation via digital overlay/SA? ***Observe platform data:*** • During wargaming, is time/distance capability used for Red and Blue force advancement? ***Query Warfighters:*** • Ask leaders how well digital wargaming worked. • Was digital wargaming effective?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Disseminate most current overlays via MDL	Battalion Company Platoon	Preparation phase	***View message traffic to see if:*** • Updates to original overlays are sent as changes via FBCB2 messages. ***View user-system interaction:*** • Verify higher echelons disseminate the most current overlays via MDL. ***Observe platform data:*** • Does TI crash from passing files that are too large (not via MDL)? • Does MDL contain more that 12 overlays (recommended max)? ***Query Warfighters:*** • What steps are taken to keep graphics simple and in separate, readily transmittable overlays?
	Perform digital rehearsal to enhance battlefield synchronization via FBCB2 tools	Company Platoon	Preparation and execution of digital rehearsal	***View message traffic to see if:*** • All platforms receive the OPORD and overlays in time to prepare for rehearsals. ***View user-system interaction:*** • Monitor if and how companies and platoons conduct digital rehearsals. ***Observe platform data:*** • During rehearsal are latest operational and obstacle overlays posted? • Do leaders delete Red and Blue icons after rehearsal so the SA picture returns to real time? ***Query Warfighters:*** • Do Plt Ldrs know how to manually enter icons and step through the mission? • Was notification made to the TI that digital rehearsal is beginning and /or ending so operators were informed of changes in SA picture? • Is rehearsal effective?
Support Logistical Preparations Unit-Wide	Disseminate digital CSS overlay with OPORD	Battalion Company Platoon	Planning phase/ dissemination of orders and graphics	***View message traffic to see if:*** • CSS overlay is disseminated with operational graphics. ***View user-system interaction:*** • Verify current CSS overlay is loaded IAW corresponding OPORD. ***Observe platform data:*** • Is CSS overlay posted at all echelons during logistical operations? • Do leaders/operators use FM to request CSS info that is on the overlay? ***Query Warfighters:*** • Ask if current CSS overlay was available. • Did leaders encounter any CSS problems during execution that should have been or were addressed on the overlay?
	Perform digital CSS rehearsal	Battalion Company	Preparation and execution of digital CSS rehearsal	***View user-system interaction:*** • Monitor if and how units conduct digital rehearsals. Do Bde S4 and S1 participate in digital mission rehearsal with FSB? • Do FSC leaders participate in rehearsal at TF Support Area? ***Observe platform data:*** • Observe CSS rehearsal. If one is not done, find out why. (Digital rehearsals are not recommended if time is short.) ***Query Warfighters:*** • Ask leaders how they conducted digital CSS rehearsal. • How was TI notified that rehearsal was beginning/ending so users were informed of changes in SA picture?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Send LOGSTAT up thru proper channels based on Cdr's Critical Tracked Items List (CTIL)	Battalion Company Platoon Platform	End of mission or time specified in OPORD	***View message traffic to see if:*** • CTIL is received by all FBCB2 platforms. • LOGSTAT is sent to CSSCS via FBCB2 by Co 1SG/XO/CP (the only authorized senders). • LOGSTATs are sent IAW SOP timeline. ***Observe platform data:*** • Did Bn tailor CTIL by SOP? • When was CTIL sent to all platforms? ***Query Warfighters:*** • Ask ALOC leaders which companies failed to send LOGSTAT to CSSCS.
	Send PERSTAT up thru proper channels to prepare for next battle or as directed by TACSOP	Battalion Company Platoon Platform	End of mission or time specified in OPORD	***View message traffic to see if:*** • Initial PERSTAT is received by all platforms. • PERSTAT is sent to CSSCS via FBCB2 by Co 1SG/XO/CP (the only authorized senders). ***Observe platform data:*** • Did Bn tailor initial PERSTAT by SOP? • When did Bn disseminate PERSTAT to all platforms? • Did Co refine PERSTAT prior to sending it to CSSCS? ***Query Warfighters:*** • Ask ALOC leaders which companies failed to send PERSTAT to CSSCS.
	Use FBCB2 to determine logistical status of unit	Battalion Company Platoon	Start and end of mission	***View message traffic to see:*** • When LOGSTAT and PERSTAT are sent. • If CSSCS receives LOGSTATs and PERSTATs. ***Query Warfighters:*** • What is the logistical status of their unit/platoon? • When are next supplies due in?
	Utilize Supply Point icon	Company Platoon	Preparation and execution phases	***View message traffic to see if:*** • Supply point personnel send Supply Point Report depicting stockage levels at the supply point. ***View user-system interaction:*** • Do leaders check status of on-hand supplies? Do they request supplies from their *closest* point if their assigned supply point is zero-balanced? • Can FBCB2 operators locate the Supply Point? ***Observe platform data:*** • Note during mission if stockage levels increase/decrease. • Do Supply Point icons appear on displays? ***Query Warfighters:*** • Ask operators if they know how to find and use Supply Point features. • Do operators know how to check stockage levels?
	Use navigation tool or SA to execute resupply missions	Platoon	Resupply mission	***View user-system interaction:*** • Do transporters use NAV tool during deliveries (as required) or do they just apply the "center on" function and drive to their location, increasing the risk of fratricide in hazardous areas? ***Observe platform data:*** • During transport missions, do drivers use FBCB2 for assistance, when needed? ***Query Warfighters:*** • Ask transporters if they are familiar with capabilities of NAV tool. • Did Plt Ldrs instruct transport drivers to stay on the route so they could better monitor status of deliveries on FBCB2?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
Control Indirect Fires	Properly route CFF so that supporting AFATDS receives and processes the request	Battalion Company Platoon Platform	UTR change	***View message traffic to see if:*** • Co FIST routes CFF to TF FSE (FBCB2 to FOS to AFATDS). • TF CFF (FBCB2) reaches Bde FSE AFATDS. • Requestor receives message to observer verifying CFF was processed. ***Observe platform data:*** • Does target symbol appear on FBCB2 display? • Monitor Co FIST FBCB2 to ensure all CFFs are addressed. (If CFF is not sent through proper addressees, fire mission will not be processed. UTR typically results in routing problems.) ***Query Warfighters:*** • Ask operators if TACSOP specifies who can send digital CFF. • Ask leaders if they encountered CFF problems.
	Use preplanned CFF linked to Quick Send button	Battalion Company Platoon	Preparation phase	***View user-system interaction:*** • Determine if leaders use Quick Send button for preplanned CFF. ***Observe platform data:*** • View FBCB2 to verify Quick Send button has CFF ready to send. ***Query Warfighters:*** • Ask leaders how often they used Quick Send.
Avoid Fratricidal Situations via SU	Disseminate and update obstacle overlay	Battalion Company Platoon	Prior to and during mission execution	***View message traffic to see if:*** • Obstacle Reports are sent upon emplacement or detection of obstacle. ***View user-system interaction:*** • Verify current obstacle overlay is in MDL. ***Observe platform data:*** • Monitor displays to see if current obstacle overlays are posted. • Did any fratricides occur due to entering hazardous areas? Why? ***Query Warfighters:*** • Did leaders and operators post current obstacle overlay? • Did operators discover any obstacles? If so, was an Obstacle Report submitted? • Did fratricide occur? Why?
	Perform Net Join to ensure complete BLUFOR SA picture when servers fail	Company Platoon Platform	EPLRS server becomes inoperable	***View user-system interaction:*** • See if operators perform Net Join so their icon will be visible on SA. ***Query Warfighters:*** • Ask operators if they know how to perform Net Join. • Do operators know "immediate action" to take if their EPLRS server fails?
	Create manual icons so non-reporting elements become part of Blue SA picture	Company Platoon Platform	Dismounted operations, non-reporting platforms (deadlined, joint, or multi-national forces), system failures, or displaced civilians in maneuver area	***View message traffic to see if:*** • Leaders send Friendly Position Reports for dismounts or non-reporting elements. ***View user-system interaction:*** • Do Recon troops create manual icons for their dismounted soldiers? • Monitor how leaders track and inform other elements where non-reporting elements are. • If non-reporting element is verified as friendly, does the observer enter a manual icon? ***Observe platform data:*** • Were NFAs created and disseminated via FBCB2 to protect static dismounts? • Were manual icons created for non-reporting vehicles and civilians? ***Query Warfighters:*** • Ask leaders/operators if they know how and when to create manual icons. • What other plans were there to protect non-reporting elements? • Were operators aware of Recon elements operating forward of their position?

Skill	Performance Goal	Echelon	Trigger	Where to Get Data
	Apply Spot reporting and handoff procedures to keep Red picture current	Company Platoon	Observation of any enemy activity	***View message traffic to see if:*** • Users submit Spot Reports. ***View user-system interaction:*** • Determine if Red icons are stale (they fade out if not periodically deleted and reentered). • Does initial observer perform Spot Report handoff when he no longer has "eyes on" the enemy? ***Observe platform data:*** • Are Spot Reports submitted via FBCB2? ***Query Warfighters:*** • Who submitted initial Spot Report? What was the plan for continuous monitoring (if possible)? • Does TACSOP specify Spot reporting and monitoring procedures?
	Maintain command awareness of number of platforms reporting to the TI, to gauge risks	Battalion Company	Prior to execution or after UTR change	***View user-system interaction:*** • See if S6 identifies CSMA servers and builds a query for a snapshot view of whether these critical platforms are transmitting. ***Observe platform data:*** • Observe S6 actions if low # of platforms are reporting. ***Query Warfighters:*** • Are Cdrs aware of S6 capabilities? • How many systems are required to be operational prior to SP? • What actions are taken if too few are reporting?
Employ Filter Settings to Create a Common or User Desired Picture	Use collapse/ expand function to reduce screen clutter	Battalion Company Platform	Receipt of new mission	***View user-system interaction:*** • See if users employ collapse/expand function to reduce screen clutter. ***Observe platform data:*** • Do platform displays enhance the tactical picture vs. confuse it with screen clutter? ***Query Warfighters:*** • Ask operators if they know how to use the collapse/expand function. • How often and under what circumstances do operators use the collapse/expand function?
	Achieve desired operating picture to facilitate situational understanding	Battalion Company Platoon Platform	Continuous, all phases	***View user-system interaction:*** • Do users set their filters by echelon or unit type so their maneuver picture is tailored to their needs and is easy to follow? ***Observe platform data:*** • Does display clutter make it hard to tell icons apart? • Is "Set" button on FBCB2 screen yellow? (Depicts that at least one filter is set) ***Query Warfighters:*** • Ask operators if TACSOP recommends platform filter settings. • How do settings vary according to the mission?
	Use Center of Mass (CM) function to create clear friendly picture	Battalion Company Platoon Platform	Prior to start of mission and when METT-TC change dictates	***View user-system interaction:*** • Do users apply CM function to get a clearer picture of Blue forces for current phase of operation? ***Observe platform data:*** • Are platform displays easy to understand and follow? • How clear is the Blue picture? ***Query Warfighters:*** • Ask operators if they know how to use the CM function. • When do operators use the CM function?

APPENDIX C: USEFUL SOURCES OF INFORMATION

TRW Inc. (1999). *Digital operator's guide: Company and platoon level* (FBCB2 version 3.1). Killeen, TX: Author.

TRW Inc. (2000). *Digital operator's guide: Company and platoon level* (Revised for FBCB2 version 3.2). Killeen, TX: Author.

TRW Inc. (2000). *Digital operating guide for brigade and battalion staffs* (ABCS version 6.1). Killeen, TX: Author.

Barnett, J. S., Meliza, L. L., & McCluskey, M. R. (2001). *Defining digital proficiency measurement targets for US Army units* (ARI Technical Report 1117). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Dudley, M. G., Johnston, J. C., Jones, W. S., Strauss, C. P., & Meliza, L. L. (2001). *Making the transition from analog to digital warfighting: Changes in unit behavior and knowledge* (ARI Research Report 1785). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Dudley, M. G., Hill, R., Johnston, J.C., Jones, W.S., LeGare, M., Leibrecht, B.C., Longoria, K., & Meliza, L.L. (2002). *Measuring digital proficiency: Assessment approaches and echelon considerations* (ARI Research Report 1791). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A405055)

Warrior-T (2002c). Force XXI battle command brigade and below (FBCB2) operator, integrator, and decision maker shared individual tasks supporting ST20-101-5-ABCS (3 Jul 2002 draft). Fort Hood, TX; Warrior-T Project Office.

APPENDIX D: LIST OF ACRONYMS AND ABBREVIATIONS

1SG	First Sergeant
4ID	4th Infantry Division
AAR	After Action Review
ABCS	Army Battle Command System
AFATDS	Advanced Field Artillery Tactical Data System
ALOC	Administrative/Logistics Operations Center
AO	area of operation
ARI	U. S. Army Research Institute
BCTC	Battle Command Training Center
Bde	brigade
BFA	Battlefield Functional Area
BLUFOR	Blue Forces
Bn	Battalion
BOS	Battlefield Operating System
C4I	command, control, communications, computers, and intelligence
CCIR	Commander's critical information requirement
CCTT	Close Combat Tactical Trainer
Cdr	Commander
CFF	Call for Fire
CLOS	Circular Line of Sight
CM	Center of Mass
Co	company
COA	course of action
COMSEC	communications security
COP	common operating picture
CP	command post
CSMA	carrier sense multiple access
CSS	Combat Service Support
CSSCS	Combat Service Support Control System
CTIL	Commander's tracked items list
DP	decision point
DTG	date time group
EPLRS	Enhanced Position Location Reporting System
FBCB2	Force XXI Battle Command Brigade and Below
FFIR	friendly forces information requirement
FIPR	flash-immediate-priority-routine
FIST	Fire Support Team
FM	frequency modulation
FOS	Forward Observer System
FRAGO	fragmentary order
FSB / FSC	Forward Support Battalion / Forward Support Company
FSE	Fire Support Element
FTX	field training exercise

HQ	headquarters
IAW	in accordance with
LD	line of departure
Ldr	leader
LOGSTAT	Logistics Status [Report]
LOS	Line of Sight
LP	listening post
MA	Machine Acknowledgment
MDL	Mission Data Loader
MDMP	Military Decision Making Process
MEDEVAC	Medical Evacuation
METT-TC	mission, enemy, time, troops, terrain, civilian considerations
MSTF	Mission Support Training Facility
MTP	Mission Training Plan
NAV	Navigation [tool]
NBC	Nuclear, Biological, Chemical
NFA	no fire area
NFZ	no-fly zone
NTC	National Training Center
OA	Operator Acknowledgment
O/C	observer/controller
OP	observation post
OPORD	operation order
PCC	Pre-Combat Checks
PCI	Pre-Combat Inspections
PERSTAT	Personnel Status [Report]
Plt	platoon
SA	situational awareness
Sgt	Sergeant
SITREP	Situation Report
SME	subject matter expert
SOP	standing operating procedure
SP	start point
SU	situational understanding
SysAdmin	System Administrator [function]
TACSOP	tactical SOP
TF	task force
TI	Tactical Internet
TOC	tactical operations center
UAV	unmanned air vehicle
URN	Unit Reference Number
UTO / UTR	unit task organization / unit task reorganization
WARNO	warning order
XO	Executive Officer