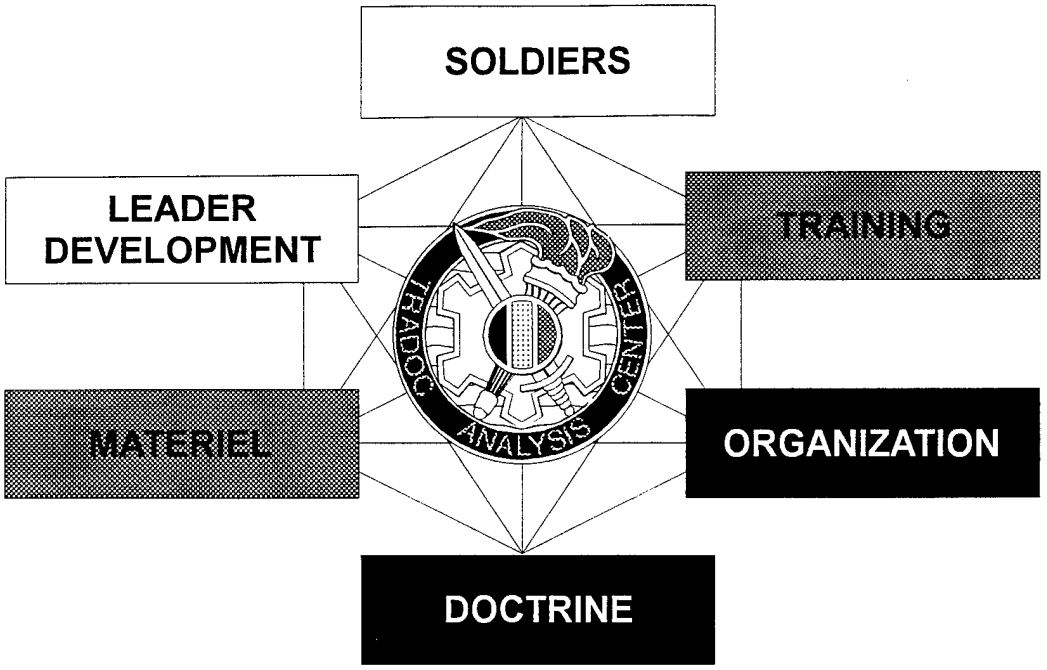
Staff Organization and Processes for the Digitized Division: The Combat Information Center



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Prairie Warrior 96
Advanced Warfighting Experiment

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Introduction

Purpose

This paper presents observations and recommendations concerning division staff organization processes associated with the Combat Information Center (CIC) organizational concept developed by EER Systems, Inc., under contract, for the Battle Command Battle Laboratory - Leavenworth (BCBL(L)). Observations were based on the implementation of the CIC concept in the Mobile Strike Force (MSF), a notional division-sized force used by the Army for investigation of Force XXI issues. MSF operations were observed during the 1996 Battle Command Elective (BCE), taught by instructors from the U.S. Army Command and General Staff College (CGSC), and the Prairie Warrior 1996 (PW 96) Advanced Warfighting Experiment (AWE).

Focus

The U.S. ArmyTraining and Doctrine Command's (TRADOC) Analysis Center (TRAC) addressed staff organization and process issues associated with the implementation of the CIC concept as part of the overall analytical support to the PW 96 AWE. The U.S. Army Operational Test and Evaluation Command (OPTEC) provided direct analytic and observation support to TRAC for the PW 96 AWE. The relevant objective, issue, and essential element of analysis (EEA) addressed in this investigation are shown below.

Experimentation Objective
To assess the capabilities of selected initiatives in the command and control battlefield operating system

Issue: Based on MSF battle staff organization and TTPs, how effective is planning and the processing and dissemination of information?
EEA: How effectively does a centralized combat information center (CIC) meet the needs/requirements of a modernized force by developing and disseminating a standardized relevant common picture (RCP)?

Issue: How do advanced battlefield visualization capabilities affect the warfighting capabilities of the MSF commander and staff?
EEA: What are the maximum, nominal and minimum frequency of information updates to the RCP?

Figure 1. Study focus

A key hypothesis for research of the CIC was drawn from the CIC concept. This was:

- There is a major underlying principle that should be a part of every digitization concept: horizontal integration must be a natural result of staff activities that does not require explicit attention. It should not be a separate process in which the staff engages and to which the staff diverts any of the commander's vital resources of time, tempo, people, and information.

Approach

Experiment Context

BCBL(L) intended to explore elements of information operations (IO) and future battle command in a Battle Command Training Program (BCTP) seminar-like environment. The PW 96 AWE provided this framework within the context of two CGSOC activities. These activities were the BCE, a course (A308) developed jointly by BCBL(L) and CGSC, and the PW student exercise which the college conducted in May 1996. Eighty-nine CGSOC students enrolled in A308 were assigned command and staff roles of a division-sized MSF, both for the BCE exercises and in PW. A CGSC instructor, served as the MSF commander. In addition to classroom instruction on the MSF concept and technology training, simulation exercises (SIMEX) were conducted using the Corps Battle Simulation (CBS) as the exercise driver. The short schedule limited the ability of the MSF staff to fully achieve staff cohesion and proficiency with the information technologies.

Analysis Support

Observation teams focused on the MSF staff organizations during SIMEXs to assess the CIC concept and identify opportunities to improve CIC staff processes and organization. To better understand the extent of implementation of the CIC concept in the MSF, members of the study team attended the BCE instructional classes, guest lectures, and other events and observed each of the SIMEXs and PW. Observers made assessments based on current doctrine, concept intent, and their own experiences with staffs.

The Combat Information Center Concept

Background

The CIC supports the information needs of the commander, the staff, and subordinate echelons. The CIC gathers, integrates, and synthesizes information and/or information products into a focused, division-level central database and maintains that database for the commander and all other elements of the division headquarters. It also supports the database systems of lower echelons and interfaces with those at higher echelons and adjacent forces. It synthesizes, maintains and shares the relevant common picture (RCP). The CIC anticipates, collects and assesses information or information products in response to identified requirements described in the division information collection plan to satisfy the commander's critical information requirements (CCIR) and then distributes the resulting information products to the commander and staff. The CIC makes those products accessible throughout the commander's battlespace to subordinate and supporting forces, to higher and adjacent echelons, and, as required, to other organizations whose activities affect the commander's battlespace. However, the complete database is not available, currently only the portion actually transmitted by the CIC staff in the form of a division level RCP is shared.

The key operating principle is to focus on the information needs of the commander and staff. The CIC uses the CCIR and other established requirements to focus its gathering, processing, and filtering of information. It focuses information collection to support current and projected requirements, and processes information into an integrated, coherent product -- the

RCP. In addition to the RCP, the CIC fills specific requests for information not contained within the RCP that the commander and staff require. The CIC also protects the central database and proactively seeks to reduce the impact of information crises.

TRADOC Pamphlet 525-5, *Force XXI Operations*, 1 August 1994, describes the RCP as follows:

> Collective unit images will form a battlespace framework based on shared, real-time awareness of the arrangement of forces in the battlespace, versus a rigid framework of battlefield geometry (phase lines, objectives, and battle positions). This system permits commanders at every level to share a relevant, common picture of the battlefield scaled to their level of interest and tailored to their special needs.

The primary benefit of the RCP is increased situational awareness. It provides commanders and staffs with a common, consistent, shared picture of the battlespace situation upon which to base plans and execute operations. It also increases the commander's capability to integrate and synchronize the force. Further, the RCP enhances a force's ability to avoid fratricide.

CIC Staff Functions and Processes

The CIC's functions and subordinate tasks include:

- Establish and maintain the division headquarter's (HQ) central database:
  - Develop, operate, and maintain the force-level information management system
  - Project changes in information requirements and acquire needed information
  - Identify information sources
  - Pull information vertically
  - Pull information laterally
  - Maintain the current situation, including the current enemy situation (status, capabilities, most likely/dangerous course of action (COA), in the central database
  - Maintain the airspace use and situation
  - Maintain accurate unit personnel status information in the central database
  - Maintain terrain information
  - Support the conduct of continuing intelligence preparation of the battlefield (IPB)
  - Support lower echelon information requirements/systems
  - Reduce the impact of information crises by establishing, maintaining, and ensuring continuity of operations in the event of catastrophic loss
  - Coordinate information protection actions with the signal battalion and coordinate counterintelligence support to protect the division HQ central database

- Input to CCIR development and solve CCIR:
  - Satisfy intelligence requirements (IR), priority intelligence requirements (PIR), and friendly forces information requirements (FFIR)
  - Promulgate the essential elements of friendly information (EEFI)
  - Anticipate future information needs

- Synthesize and maintain the division-level RCP:
  - In response to the commander's RCP parameters, synthesize the RCP
  - Provide the RCP to the commander and tactical operations centers (TOC) and share with other appropriate users
  - Monitor the current situation and update the RCP at commander-established and directed intervals or SOP

- Serves as the information gateway to support Army forces (ARFOR) or joint task force (JTF) HQ responsibilities, as required
  - Develop and maintain tactical standing operating procedures (TACSOP) for assumption of ARFOR or JTF responsibilities
  - Identify and incorporate ARFOR or JTF central database requirements
  - Collect, fuse, and assess ARFOR or JTF information
  - Process ARFOR or JTF information into the central database
  - Incorporate and maintain ARFOR or JTF knowledge in the RCP in response to the commander's directives

To optimize the CIC's capabilities to support the division commander, the CIC concept incorporates a design that provides enhanced mobility and deployability. This design responds to three requirements. The first and primary requirement is the need to provide the commander with maximum flexibility to configure the CIC. For example, the CIC is organized in a manner that is readily tailorable. This gives the commander the ability to combine and recombine the elements of the CIC, based upon the factors of mission, enemy, troops, terrain and weather, and time available (METT-T), while sustaining the full capabilities of the organization. Also, it promotes the ability of the CIC members to engage in continuous operations while preserving their cognitive performance capabilities, which can degrade rapidly under battlefield conditions. Those mental capabilities will become increasingly important with the proliferation of information support and other automated tools that a unit needs to effectively utilize the expanding amounts of data and/or information.

The second requirement is to use technology as the enabler of both flexibility and redesigned processes, while simultaneously using technology to reduce the overall resources required in the HQ. The design assumes the use of technologically enhanced capabilities that the army forecasts to be feasible by the year 2000 or before.

The third requirement is to remove, as much as possible, the real or artificially imposed physical, mental, and organizational barriers to intrastaff communications and understanding. This requirement focuses upon creating an internetted staff organization that assists the commander with horizontal integration of information in the force with optimum information exchange. The CIC achieves this requirement by establishing the division's central database -- ensuring that the staff and subordinates can all be on the "same sheet of music" -- and by disseminating the RCP, which gives the staff and immediate subordinate commanders a situational awareness common with that of the commander.

The assigned CIC personnel must focus their actions on the central database and the supporting information exchange and they must be able to fully leverage the technology available to the CIC. They must be responsive under all operational circumstances to the requirements of the commander and provide him with the means to exercise battle command.

C2 Systems

The CIC is equipped with sufficient automation and communication assets to enable it to support the information needs of the commander and the TOCs. Conceptually, the CIC equipment assets included the Maneuver Control System-Phoenix (MCS/P) and two duplicate main computers to operate the central database. (MCS/P devices replaced the two main computers during PW 96.) The main computers enable the CIC to engage in distributed information management by providing a central repository (often referred to as an "information warehouse") for information to satisfy the commander's information requirements. One main computer is the primary system for the central database and the other (which is a duplicate of the primary) is either a backup or is the information resource for division HQ assets remaining in sanctuary during split-based operations. The central database computers enable the creation of a virtual database developed via high-speed connectivity to the division's distributed information sources.

Signal battalion assets support the CIC to maintain the connectivity required to exchange information with all other elements of the HQ, with subordinates, and any other information source needed. The connectivity results in the CIC creating a single, virtual, logical database covering all required information.

Organization

The CIC as a staff organization fits into the division level staff as depicted in figure 2.

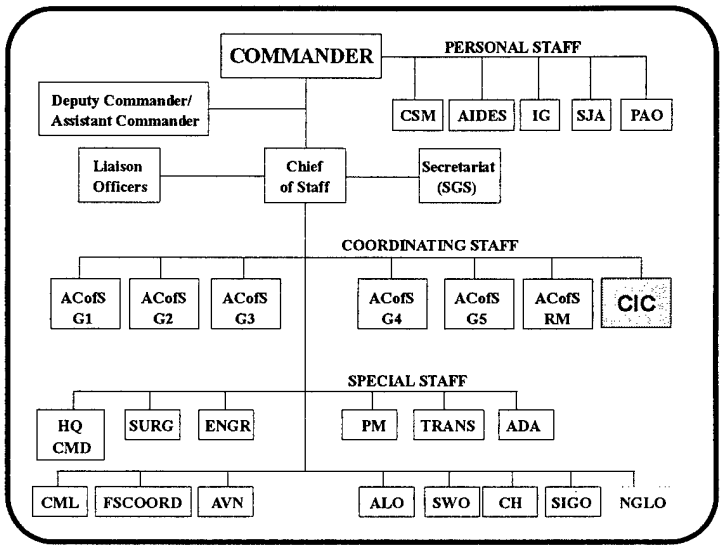

Figure 2. CIC as part of division level staff

The CIC, as implemented in the MSF for the PW 96 AWE, was organized as shown in figure 3 below. Each node represents one individual staff member who performed all operations in his specific battlefield operating system (BOS) and other tasks as detailed to him. The Fusion station integrated the outputs of all of the other stations.

The relationship of the CIC and its architecture to the rest of the MSF is shown in figure 4 below. A staff officer manned each of the separate MCS/P workstations within the CIC and represented each BOS. The fusion/operations (fusion/OPS) workstation represented the C2

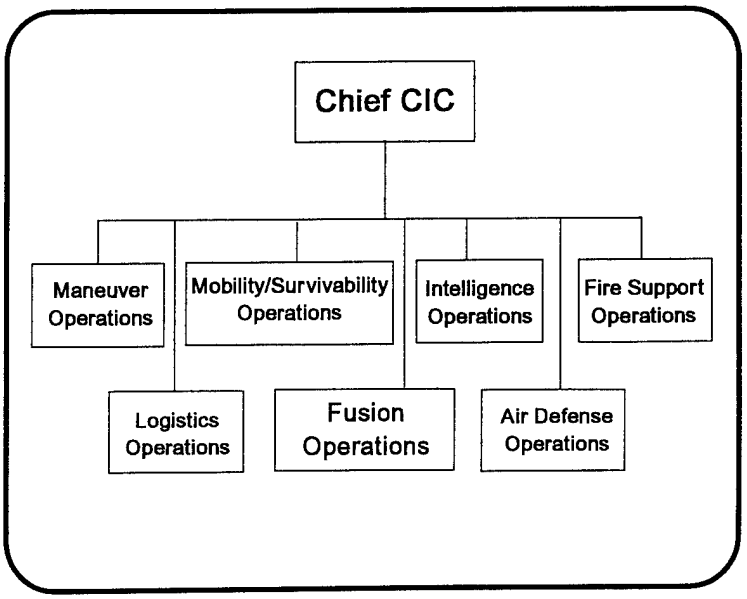

Figure 3. CIC as implemented

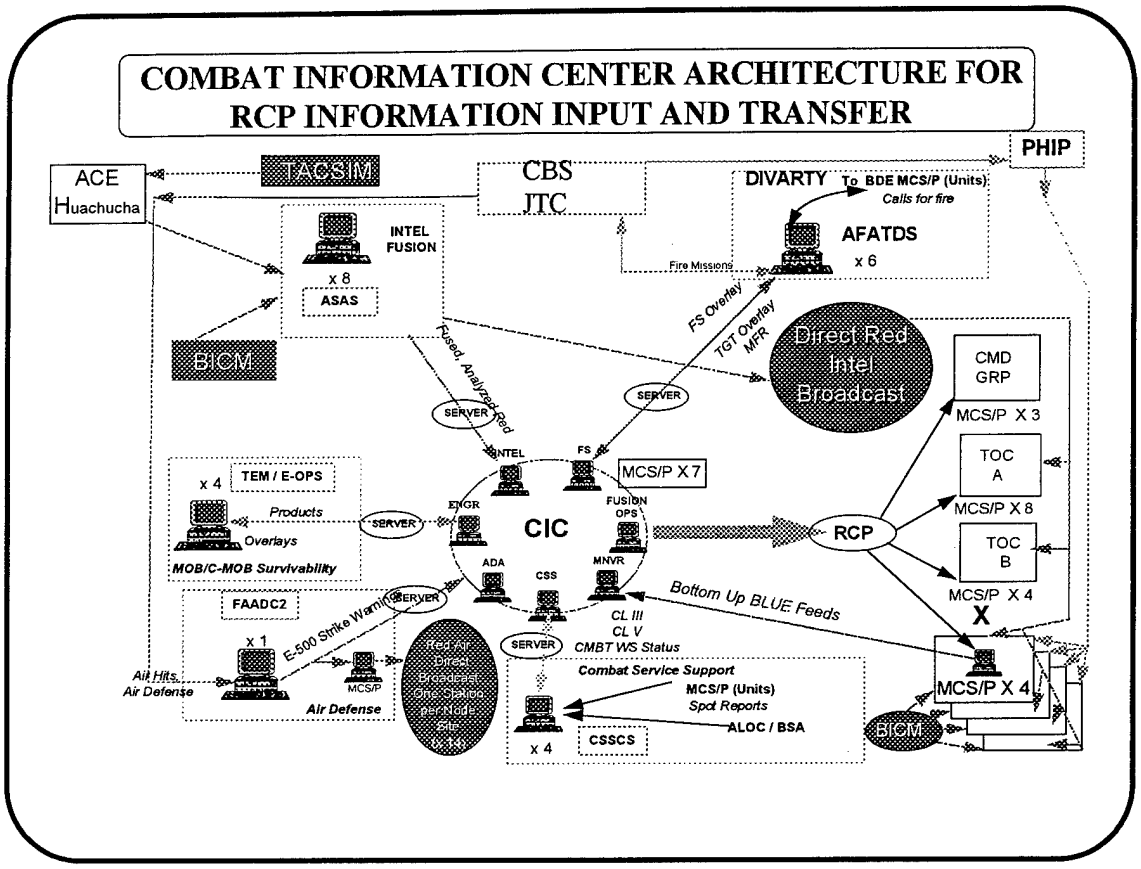

Figure 4. CIC architecture

functional area and served as the integration station for information provided by the other members of the CIC. An assistant chief of staff (AC/S) for the CIC provided direct supervision of CIC operations. In addition to the workstations, the CIC had a large screen display (60 inch monitor) connected to the fusion/OPS workstation.

Major responsibilities at each workstation are discussed in turn below.

(a) The fusion/OPS workstation requested and received specific or tailored information from the other workstations within the CIC itself. This workstation would manipulate or modify the data and create the RCP and transmit it to specific areas. The fusion/OPS workstation operator contacted adjacent units periodically to ascertain their locations and include them in the picture. The RCP contained the basic maneuver control measure graphics, battalion maneuver unit locations, smaller company, platoon, and section locations for scout and some combat support and combat service support unit locations. Other workstation inputs were attached as separate overlays that could be added to the basic picture.

(b) The maneuver workstation focused on the friendly maneuver units' order of battle (OB). This workstation received information pushed from each of the subordinate maneuver units. To prompt these units to send this information forward, the maneuver workstation operator would call the subordinate unit and direct it to forward its elements' locations.

(c) The engineer workstation received information from the MSF Mobility and Survivability (M&S) Brigade. For PW 96, this information provided the location for all the engineer assets down to bulldozer level. This workstation also prepared the operation maneuver graphics overlays, a function which would normally be performed by the maneuver workstation.

(d) The intelligence workstation used an MCS/P to receive information from the reconnaissance, intelligence, surveillance, and target acquisition tactical operations center (RISTA TOC); the analysis and control element (ACE); and the maneuver brigades' intelligence teams. This workstation would put together a composite enemy picture from all sensor and intelligence production activities within the division.

(e) The air defense (AD) workstation used an MCS/P to receive messages from the AD early warning systems throughout the battlefield. This workstation received air strike warnings and AD weapons range fans.

(f) The fire support (FS) workstation received information from division artillery (DIVARTY) on the location of the artillery units supporting each of the maneuver brigades and the location of the DIVARTY headquarters. It also received mission fired reports from the DIVARTY and kept track of the artillery control measure graphics and artillery unit status.

(g) The CSS workstation maintained graphics of the supply routes and the locations of the major logistical units. This workstation received this location information from the mobile support group (MSG) and the division support command (DISCOM). It also received logistics status reports for all units in the MSF and the MSF as a whole.

The functional workstations used information transmitted from the MCS/P, terrain evaluation model/engineer-operations system (TEM/E-OPS) advanced field artillery tactical data system (AFATDS), or the all-source analysis system (ASAS) Warlord Reconfigurable Workstations, depending on the functions performed. Additionally, the CIC monitored a Motorola "brick" radio tuned to the MSF operations and intelligence radio network. This voice network provided the opportunity for noting updates of the current operations and used by the CIC to broadcast a heads up notice to the command when a new RCP had been transmitted over the computer network.

Observations

Horizontal Integration

The division lost sight of small enemy units operating in the MSF rear area because the RCP did not have the capability to simultaneously show different levels of tactical unit resolution. These small enemy units were either special operations teams or remnants of destroyed and bypassed units. As operations progressed, these units would attack supply convoys or artillery unit movements in the MSF rear area that disrupted MSF plans and operations. The only way the MSF learned about these units was through combat encounters which caused the commanders and staff to take deliberate actions to influence the situation. Besides the lack of resolution of enemy units that led to the loss of rear area situational awareness, the lack of dedication of intelligence assets to support the rear effort contributed to this problem.

In several instances the division lost sight through the RCP of nuclear, biological and chemical (NBC) contaminated areas. This resulted in follow-on units wandering into the contaminated areas and incurring unnecessary casualties. NBC hazard warnings had been posted to the RCP but, over time, there were not revised or were dropped off the RCP and became "out of sight, out of mind" to the commanders and staff.

The RCP as developed in PW 96 was not a natural result of normal staff activities. It was a special effort that required dedicated personnel to perform. This was based on several assertions about the RCP.

- *Assertion: A centrally developed MSF RCP will be relevant to subordinate units.* As pictured in figure 5, the RCP is more than one single picture that is developed for the division commander, and also sent around and viewed by the other commanders and

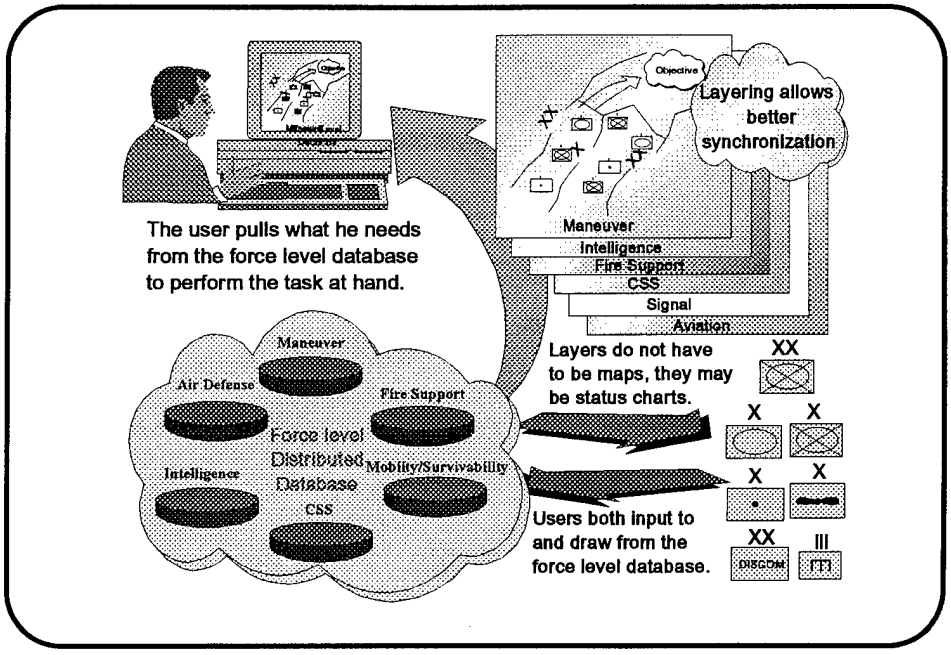

Figure 5. What makes an RCP

staff. An RCP is a picture developed by any user of information on the battlefield. The key is that the information the user is viewing is related to the job, task, or function he is performing (relevant) and that the information is being drawn or provided to him from the same common force-level database as all other users (common). This information may be in the form of interactive graphic map overlays, or tables of data as in logistical supply data, or gumball charts that reflect some relational status (picture). The concept of everyone viewing exactly the same single picture as the division commander, as implemented in the MSF in PW 96, provided a common picture, but often not a relevant picture. What the G2, the G4, the DIV engineer, the DIVARTY, the aviation brigade commander and all of the maneuver brigade commanders choose to view most likely will not be the exact same picture as the division commander, but will be relevant to their particular functions and tasks at hand. The division commander most likely will view an aggregate of the views of his subordinate commanders and staff elements. The commander should not be driving the detail that his subordinate commanders and his staff view; he should be viewing what enemy and friendly forces are doing, what subordinates are providing to the command force level database (the body of information), directing what information he needs from them (technology should support this), and using that as input to his decisionmaking process. The old saying: "tell them what you want done, but don't tell them how to do it" applies directly to this case. By dictating a division-level RCP (as was done in PW 96), the commander, in effect, dictated how he wanted his subordinates and staff to do their business. He dictated the use of a specific tool. This was an extra burden that, in many cases, was not relevant to the subordinates or staffs task at hand.

- *Assertion: An RCP which is relevant to the commander is sufficiently relevant to the staff.* The staff performs those tasks associated with the science of control. They perform those tasks in the name of and by authority of the commander to ensure that the organization operates in a smooth, coherent, and orderly manner. It does not mean that everything the staff does will be reviewed by the commander in detail or that the only thing the staff does is to provide information to the commander for him to make decisions. There are many background tasks that the commander may be aware of, but may never see. The staff compiles, reviews, edits, sorts, and filters data and information to make sure that the right information is presented to the commander. They help prevent information overload. It is impossible to present the entire situation and status of everything in a division in the level of detail most commanders may want in one picture. It takes several pictures because all the information will not fit on one picture in a manner that the human mind can understand, interpret, and use. Those pictures are the natural output of the staff and subordinates as a normal course of their daily work. Combined, they will provide the commander the total body of information he needs for decisionmaking.

- *Assertion: Information hand-offs will not adversely affect the RCP.* As shown in figure 5, the RCP may have multiple layers, overlays, screens, tables, etc., that can be viewed--some simultaneously and some not. This requires an integrated software package that collects, sorts, and collates these different pieces as the staff and

subordinates create them or provide input/updates to them in an interactive, seamless environment. As an example, as the intelligence picture changes those changes must be automatically reflected in the output database of the intelligence organization and therefore, all views of that output. In other words, as enemy unit locations are changed as a result of intelligence analysis in the ACE and posted to the intelligence output database (picture), those new locations also appear on the screens of everyone looking at that same output database (picture). This could be most easily likened to a chart in a word processing document that is based on a database or spreadsheet developed in another software program, but linked to the word processing program (as can be done in many commercial software suites such as Microsoft Office, Perfect Office or the Lotus SmartSuite). When the information in the spreadsheet is updated, the chart in the linked document is automatically updated to reflect that change. This type of updating and linking truly allows the horizontal integration to be a natural result of staff activities and which does not require explicit attention.

Timeliness and Commonality of Information

Despite the implementation of the CIC, the MSF staff in the PW 96 AWE could not efficiently and effectively facilitate the hand-off and horizontal integration of information from BOS and functional areas. The MSF SOP called for the CIC to publish and distribute the RCP on a half hour schedule. The process of building and disseminating a RCP was not very efficient. It required a special staff element (the CIC) to perform a specific process which violates the basic principle that every digitization concept should be striving to achieve: *horizontal integration must be a natural result of staff activities that does not require explicit attention. It should not be a separate process in which the staff engages and to which the staff diverts any of the commander's vital resources of time, tempo, people, and information.* The CIC was able to publish an RCP about every 48 minutes over the entire course of the exercise. The table below shows the actual number of times and duration between events that the RCP was distributed.

	SIMEX 1	SIMEX 2	PW 96
Number	9	10	65
Minimum (Minutes)	35	25	13
Maximum	135	115	147
Mean	75	57.5	48.2
Standard Deviation	38.7	28.1	31.1
Coefficient of Variation	0.52	0.49	0.64

Table 1. CIC RCP distribution times

Even though 48 minutes may seem very timely by today's standards, that interval could not keep pace with the close fight being conducted by the maneuver brigades and monitored by TOC A. The timeliness of the situational picture was a problem for TOC A and the maneuver brigades throughout the experiment. Just because the CIC published an RCP every 48 minutes did not make all of the information in that picture current or relevant. Typically, the intelligence information was two to three hours old and sometimes, because of lack of input from the

subordinate maneuver brigades, some of the friendly maneuver information was up to two hours old. This caused the brigades to lose confidence in the situational picture provided by division because it was not near-real time and was not a relevant situational picture they could use to conduct and plan combat operations. The consolidated situational picture developed by the division seemed to provide the maneuver brigades with only a "snap shot" in time of the division picture.

The CIC could not integrate timely enemy air attack tracking or theater ballistic missile (TBM) tracking or potential impact area information into the RCP. There were very limited forward area air defense command and control (FAADC2I) resources available to the MSF. There was no commander's real time display (CRTD) within the MSF ADA BN, the CIC, or any of the other staff elements nor was there any capability to port that information directly into MCS/P for incorporation into the RCP. The only way the information did get displayed in MCS/P was by manual transcription from FAADC2I into MCS/P. The time delay required for this transcription was sufficient to cause the information to be obsolete by the time it was distributed.

The integration of information was not totally smooth during planning or execution of the plan. This was thought to be related to limited interoperability of the Army tactical command and control system (ATCCS) systems, and even further limited use of existing connectivity. Some ATCCS systems can send messages to MCS/P and some ATCCS messages can be generated in MCS/P, but they do not fully interoperate both ways. The only other pair of systems that could interoperate were ASAS and AFATDS in a one-way feed from ASAS to AFATDS. Being able to share some messages is not the level of data sharing envisioned for Force XXI. All of the information must be capable of being generated from, and used by, any workstation throughout the division. If not, there will have to be a proliferation of each system to every potential user location and training on each system for each user.

Utilization of the CIC Staff

The CIC had little to do during the planning process. The planning process itself was not supported with innovative digital planning tools, so there was no enhancement in information sharing and planning. The output or outcome of the planning process provided products that could be shared or used by other staff elements and subordinates for their planning efforts. These outputs supported the development of a RCP or a division-level current situation map for starting and executing the exercise. This picture was not, however, a common and consistent picture or a road map against which success could be gauged.

The CIC spent most of its resources of time and energy redoing work that had already been done by the other staff elements and subordinates and shipping that information back to them. By having the CIC as a centralized collection point for the assembly and dissemination of information, the CIC became the bottleneck for information flow and the development of situational awareness throughout the division. When information was not up-to-date or lacking, the commander and staff generally linked the problem to the CIC. However, most of the time, the problem was the lack of input and updates from subordinates to the CIC.

Staff Training

User training was inadequate. The system was too complex to achieve competency during the training period. There were several factors contributing to the training difficulties. One factor was the requisite reliance on the multi-layered menu system. Almost every action that was performed on the MCS/P required from two to five separate menu selections or steps. This made learning any particular procedure difficult without extensive task repetition. This also made task completion a dull, mundane and boring job at times which increased user frustration when trying to accomplish a mission quickly. Several students, and at least one subordinate command group, never achieved a firm basic mastery of the tasks they needed to perform basic functions on the MCS/P. This group frequently ignored requests or demands for information to be sent to the CIC for inclusion in the RCP because they did not know how to perform the tasks required and considered the use of the MCS/P more of a nuisance than a battle command aid. They preferred to do almost all of their command and staff planning on paper maps and only provided input to the CIC and division staff electronically when forced to. Repetitive type tasks that may require the use of multiple subcommands should be consolidated through the use of user preferences so that a single command will deliver the user the product most often desired. Adjustments could then be made to the user's norm on an "as needed" basis. This could reduce training time, execution time, and user boredom and frustration.

A second factor was the required use of Systems Query Language (SQL) to pull up information from the local unit database to display and observe status of units. SQL can be very complex and difficult to understand, learn, and gain proficiency. Here again simplified approaches could be set up through user preferences for the most common queries.

A third factor was the lack of the equivalent of simple, familiar office automation programs within the MCS/P primary software. The Microsoft Office suite of software was available on the MCS/P in a WinDD format for word processing, graphics, database management, and spreadsheet. However, use of these programs consumed large volumes of communications bandwidth on the local area networks (LAN) because the software was network-based. But, because these programs were available and the students were much more familiar with these from their previous personal and CGSOC course experiences, students tended to prefer and more readily use these computer programs to prepare orders and reports. For the primary software that is to run on the MCS/P and future ABCS systems to be easier to learn, to be less frustrating to the user, to require less training time, and be more universally acceptable by the user community, that software must have the look, feel, and functionality of commercial off-the-shelf software that is widely used on home and office personal computers. It must also be the same software that the users will be using on a daily basis in garrison operations so that they will not have to relearn the other system every time they go to the field. The phrase "train as you fight and you will fight as you train" is applicable here.

A fourth factor contributing to the training difficulties was the lack of standardized file naming conventions and procedures at the beginning of the BCE. This problem was solved during the SIMEXs through several face-to-face conferences between the commander and his staff and the subordinate command and staff organizations, and by developing and adhering to a

standardized file naming convention specified in the unit SOP. The development and adherence to a logical SOP for file naming conventions is essential for keeping track of messages and information.

Conclusions

The investigation of the CIC concept indicates that it is an inefficient and ineffective organization and method for collecting and disseminating information within the division and as such, should not be implemented.

Positive aspects about the organization and structure of the CIC are:

- The CIC can produce a division-level situation map and produce periodic updates on about an hourly basis.
- The CIC did support the integration and synchronization of separate BOS and functional area activities during planning and execution.

Negative aspects of the CIC concept are:

- The CIC was a bottleneck to information flow and the information the CIC provided could be obtained through other means.
- The CIC concept did not adequately describe the means to take full advantage of combined, integrated computer information and communications technologies and the potential power of the integration of information. Thus, many of the MSF students were unsure how to pursue this capability.
- The term "relevant common picture" was based on several assertions that were misunderstood by most exercise participants, as well as doctrine and combat developers. Clarity in the understanding of terminology is critical.
- The CIC is an ineffective use of resources at the division-level staff.

Recommendations

The CIC concept need not be examined further.

The following actions should be taken in continued pursuit of the objective appropriate automation systems, software, and organizational structure to support the Force XXI concept:

- Continue development of improved information technologies--providing the required functionality in an integrated set of software packages on a common hardware platform--in sufficient quantities for the staff.

- Review the G staff concept to identify areas where information flow can be improved and enhancements can be made in staff operating processes and procedures.

- Review the procedures that make up the battle command processes in light of the desired and real-world capabilities of the C2 hardware and software, resulting in across-the-board integration of information requirements, functions, and capabilities.