EXPERIENCES INCORPORATING A FORCE-PROJECTED BRIGADE INTO A DIVISIONAL TACTICAL INTERNET

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ABSTRACT
This paper details the experiences of the 2nd Infantry Division (2ID) integrating a CONUS-based, force-projected brigade and South Korean armored brigade into the division's tactical Internet. During Foal Eagle 1997 (FE97), a brigade from the 1st CAV Division deployed to Korea and joined the 2ID for FE97 in some of Korea's most difficult terrain for communications. Additionally, 5th Republic of Korea Armored Brigade (RAB) also joined the Division. While the integration of a new unit into the division's communications and information architecture is always difficult, this difficulty was further compounded by a revolutionary divisional information management system. During 1997, the division's G6 staff and signal battalion completely reengineered the division's communications and information infrastructure to meet increasing demands for tactical data information systems. Key among these innovations were the dynamic assignment of bandwidth as required and the introduction of the tactical Internet, which revolutionized how the division managed tactical information. While these efforts greatly enhanced the ability of the division to synchronize the efforts of divisional units, it also significantly complicated the rapid integration of a new U.S. brigade and a Korean brigade into the division's information architecture. This integration process was further complicated by the need to operate within a Korean Corps with a completely dissimilar communications and automatons infrastructure. This paper details the lessons learned integrating a force-projected brigade as well as providing the benefits of a tactical Internet to a coalition lower and higher headquarters using a dissimilar communications and automation architecture.

INTRODUCTION

The Problem
The 2nd Infantry Division (2ID) had an information management problem. Faced with one-year tours, an extremely high operations tempo, and the 4th largest army in the world only 15 miles away, the young soldiers assigned to 2ID could not effectively use the Maneuver Control System (MCS). Despite the division running a one-week formal training course constantly, operators could pass text messages between tactical operations center at best. The software was too complex for the average soldier to understand. The hardware was specialized and few soldiers could troubleshoot or correct even simple hardware problems. Finally, the hardware requirements of the software limited the number of workstations within the division. There was no redundancy available and if a critical site lost its MCS, that site would be down until the remaining MCS terminals could be reallocated within the division.

Figure 1. Views of TACWEB: (a) Unit Status Report and (b) BOS Status Report
The task organization of the division further exacerbated these problems. During normal exercises and at the initial onset of hostilities, 21D would fight as a subordinate to the 7th Republic of Korea (ROK) Corps. Furthermore, one of its four maneuver brigades is a ROK armor brigade. During the first days of a Korean conflict, 21D would have to receive and incorporate into this division’s structure a number of additional U.S. brigades in a very short period of time. Rapid force integration further complicated the information management problems of MCS and highlighted significant shortcomings in existing tactical information management software.

What 21D needed a simple, easy-to-use tactical information management tool that enhanced operational awareness between the division TOCs and major subordinate commands, facilitated rapid changes in task organization and the reception and integration of force-projected major subordinate commands, ran on a common and widely available hardware platform, and provided a common picture of the battlefield in near real-time. Unfortunately, no such tactical information tool existed.

The Solution

As a result of these problems, 21D G6 office and the 122nd Signal Battalion developed the 21D Tactical World-Wide Web (TACWEB) (See Figure 1-3). TACWEB is a simple, easy-to-use classified, dynamic, near real-time tactical information management system that tracks the battle status of units, battlefield operating systems (BOS) and other key information such as significant events, commander situation reports, unit locations, weather, priority information reports, personnel status reports, and logistics status reports. It provides the ability to build and implement multiple task organizations rapidly that provides a near real-time common picture of the battlefield. TACWEB minimizes network bandwidth requirements so as to be highly effective over Mobile Subscriber Equipment (MSE). TACWEB provides an effective information management system that quickly focuses leaders on issues and provides a degree of synergy previously unseen. It answers the information management problems of MCS. It also answers the force integration issues inherent in operating on the Korean peninsula but pertinent to all Army divisions. The remainder of this paper will provide a short overview of TACWEB as well as the force integration lessons learned incorporating a brigade from 1st Cavalry Division and working with a ROK brigade and Corps.

TACWEB OVERVIEW

Hardware and Software Requirements

TACWEB requires a personal computer capable of running the Microsoft Windows 95 or NT operating system and Internet Explorer 3.02 or higher WWW browser. It performs best on Internet Explorer 4.0 or higher. TACWEB requires a minimum of a Pentium 75 MHz or higher with 16 MBs or more of Random Access Memory (RAM). Because network bandwidth is the limiting factor in tactical networks, TACWEB requires a significant amount of client-side processing to minimize network traffic. As such, TACWEB performs dramatically better with more processing power and RAM. Optimal configuration is Pentium 133 or better with 24 MBs of RAM or better. More is better. In today’s personal computer market, $1000 will buy a superb TACWEB computer.

Submitting Information

Users submit information through a fill-in-the-blank Common Gateway Interface (CGI) form running on TACWEB. Users simply fill in the appropriate form for a report and click on a submit button (See Figure 3). The information is transmitted as ASCII text over the MSE network to the TACWEB server where it is automatically added to the Division’s database. When users submit an updated report, all of the information from a previous report is automatically loaded so that the user need only make the necessary changes to submit an updated report. Users can be trained to submit TACWEB reports in less than 15 minutes and to fully utilize the informational resources of TACWEB in less than four hours. Because the reports are so easy to submit, subordinate brigades and separate battalions have little difficulty submitting commander’s situation reports as needed.
Retrieving Information

TACWEB is first and foremost an information management system. All submitted information is processed by the WWW server and stored in a Microsoft Sequel database. This database in turn provides the latest information to a series of dynamic web pages that comprise the information retrieval portion of TACWEB.

All pages within TACWEB are dynamic – the pages are built dynamically using the most recent data submitted by units and staff. The divisional database takes the data provided by users and automatically transforms it into a series of automated, easy-to-understand, color-coded heads-up displays (HUDs) that track critical battlefield information. These HUDs are the gateway to additional information and consist of a series of color-coded “gumballs” (See Figure 1). Each gumball is green, amber, red, black or white depending on status. If the user moves the mouse over a gumball, a comment field automatically appears, superimposed over the HUD, with additional information on the gumball selected. By convention, all amber and red gumballs have comments. Those green gumballs that have comments have a “C” centered in the middle of the gumball. This indicates that while the system being reported is green, the commander or staff element has provided a comment that requires division command group attention. If the user desires more information, he or she need only click on the gumball to load an additional page that provides another level of detail (See Figure 2). Each gumball is linked to a different report depending on the topic. For example, the division commander reviews the Unit Status Report and notices the 1st Brigade is amber in weapons system. He moves the mouse over the amber gumball and automatically the commander’s assessment of weapons status becomes visible as a superimposed text box from the latest commander’s situation report. If the division commander requires additional information, he then clicks on the gumball to bring up a complete, color-coded display of the weapons status of the brigade with the number of operational weapons of each subordinate battalion as well as a total weapons summary of the brigade. Additional weapon status reports provide automatic totals of weapon systems across the entire division (See Figure 3). Similar automated reports are available for personnel, maintenance, and classes of supply. Thus, users can control the amount of detail visible, from division to battalion level, so as to have the right amount of information at the right time to make decisions.

As commander’s situation reports are received, the division staff can provide comments, linked to the situation report, with ongoing efforts to resolve issues. It quickly becomes clear what issues are being resolved and what issues have somehow been lost. Furthermore, because units submit situation reports every two hours or as needed, issues between units and staff elements can be resolved quickly. This increases the flow of information to the division staff and as a result increases the ability of the division to support increased operations tempo. With automated updates and color-coded displays, the division command group can quickly assess the status of the division and focus on those critical issues that make a difference.

Finally, TACWEB is easy to customize to fit rapidly changing conditions. The G3 can easily task organize the division and then change the task organization in the middle of an operation to meet operational requirements. The changes are immediately visible to all units. Additionally, up to three task organizations can be built or modified offline and instantly inserted and made the active task organization. The TACWEB task organization tool also allows other units to easily use and exploit TACWEB. It is not coded so as to work only with 21D but instead is written to work with any unit. The 82nd Airborne Division or 3rd Corps could easily install and operate the software without modifying the TACWEB software. Likewise, the G3 can easily change pacing items and weapon systems and those changes are immediately reflected on unit commander situation reports and logistics status reports. This provides the division command group the ability to track critical equipment and change what the critical equipment is as the battle progresses. For example, as the division fights defensive operations and then transitions into a counterattack and river crossing, the pacing items for subordinate units can change.

Figure 3. (a) Division Weapons Rollup and (b) Submitting a Commander’s Situation Report
LESSONS LEARNED

TACWEB has been used in a series of exercises including Ulchi Focus Lens, WarPath II, Foal Eagle, WarFighter, Iron WarSteed, and WarStrike. During a typical exercise, subordinate units access TACWEB nearly half a million times in a five-day exercise and downloaded approximately 3 gigabytes of information. The average access time was approximately 4.5 seconds. TACWEB was fast and useful and as a result, units used it extensively.

Adding External Units to the Division Command and Control Infrastructure

Interconnectivity with coalition partners was best served through liaison teams. Throughout these exercises, 2ID worked as a subordinate command of 7th ROK Corps and had 5th ROK brigade assigned as a subordinate unit. Due to completely dissimilar communications and automation infrastructures, liaison teams from the division provided communications and automation equipment to integrate the to both higher and lower coalition headquarters. Moreover, language differences further necessitated the use of liaison teams. These teams quickly integrated these headquarters into the TACWEB infrastructure. U.S. units, however, did not have these difficulties and could be quickly integrated into the TACWEB infrastructure without liaison teams.

U.S. units from outside of the division could be quickly and easily added to the command and control infrastructure of the division through TACWEB despite these units never having used the software. Because TACWEB is so easy to use and runs on commonly available software and hardware, U.S. units were rapidly integrated into the division’s C2 infrastructure. The integration of a brigade from 1st Cavalry Division during Foal Eagle 97 is illustrative of the ease of integration. Because TACWEB uses common hardware and software, the brigade utilized their garrison computers with a classified hard drive. There was no need to provide any hardware and software to the brigade. Additionally, because TACWEB is so easy to use, the brigade required minimal training to be comfortable using TACWEB with their own personnel.

In comparison, the division also integrated the new brigade into the intelligence information management system WarLord. Because did not have any WarLord terminals and the terminals are not commonly available, the division had to provide a UNIX terminal to the brigade by reallocating limited internal assets. Moreover, because the software is so difficult to use, the division could not train the brigade on the software in a short period of time and instead provided operators to the brigade. During a pre-planned exercise with a single brigade joining the division, this is a viable course of action. In a real conflict with multiple brigades joining the division in a very short period of time, the division will simply run out of UNIX terminals and trained operators before all of the brigades would be integrated.

CONCLUSION

The demands of rapid force projection and force integration have highlighted these shortcomings in existing C4I software and its development cycle. Many units have realized these shortcomings developed their own approaches including III Corps, XVIII Corps, and 2nd Infantry Division. Other units such as 10th Mountain Division are actively exploring alternatives. TACWEB was 2ID’s answer to these shortcomings. This approach has worked well in numerous exercises and supports rapid force integration. As the Army moves more to a force projection Army and an information superiority Army that faces a plethora of threats and possible missions, it’s C4I infrastructure must become adaptive, flexible, tailored, powerful, and easy to use. A revolutionary change in C4I software is required if the Army is to meet the emerging challenges of the future. 2ID’s TACWEB is a viable starting point for this critical retooling of the C4I infrastructure of the Army.

About the Authors

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