Microcomputers on the Battlefield

by Major Kriss E. Bowers

Microcomputers are being used to solve logistics problems in the 24th Infantry Division.

Are you frustrated by a division logistics system that won't take your transactions because you made some silly little error? Are you confused by the seemingly nonsensical volumes of direct support unit standard supply system (DS4) documentation? Do you panic at the thought of going to war with the one or two large computers that control the entire division logistics system, knowing full well that the enemy is planning to blow them away at his first opportunity? And doesn't it drive you up a wall that you can't get the data you want out of the system because the "computer wasn't programed to give that information"?

Well, join the club—because many of us feel the same way! Battlefield automation? Bah, humbug! If you are like most people, your initial response is, "What the heck! When the balloon goes up, we'll get rid of all this fancy equipment and go back to the stubby pencil as we've always done."

Now, if you're a logistician, and if you spend some time thinking about that response, your initial panic will be replaced by stark terror when you realize the futility of even that fleeting consolation. For, in a more rational state of mind, you will realize that—

. . .the Army isn't what it used to be. The equipment is complicated, and you can't repair it with spit and bailing wire anymore. Either you have the right part or you don't—and if you don't, you can't fix the equipment.

. . .you don't have the manpower to go manual.

. . .even if you did have enough people for the "stubby-pencil" approach, they wouldn't have experience in manual systems.

. . .further, if your division had people trained on manual systems, ultimately your transaction would have to move to a computer system somewhere in the wholesale system. And that computer is going to require the transaction to be perfect. But human transactions won't be perfect, so it will take some time to find out where you've made an error. This means more delays in an environment where speed is essential.

Before you jump out the nearest window, let me tell you that all is not lost. Help may be on its way.

Project SMART to the rescue

Under the auspices of Project SMART (supply and maintenance assessment review team), there is a design effort underway to solve all of these problems, and more.

A small team of data processors and logisticians has been formed at Fort Stewart, Georgia, to conduct a brigade-level test of automation at the prescribed load list (PLL) level. The reason there is currently no automation at the PLL level is that the Army Training and Doctrine Command, the user's representative, has never identified a need for unit-level automation. Consequently, there never has been any attempt to automate that level. If the tests at Fort Stewart bring a solution to unit-level automation needs, something may be done *for* the PLL clerk, instead of *to* him!

Problems of the current ADP system

The greatest single problem in any computer system is the high rate of input errors. The adage "garbage in, garbage out" is as valid today as it ever was. By reducing the amount of "garbage in"—by having edits that will reject bad data—we have made great strides in preventing errors from entering the logistics system. However, this approach prevents valid requirements from entering the system because they are not letter perfect.

☐ **The tactical organizational paperless service support system (TACOPS3) is set up for operation in the field.**

These error-flawed transactions eventually enter the system but only after costly delays adversely affecting readiness.

The second major problem in the current system is our reliance on manual reentry of computerized data. There are many instances within the logistics system when computer-generated hard copy data must physically accompany parts and supplies. These data must then be manually reentered into another computer system, a procedure that not only delays entry of the data but also produces new errors.

Inflexibility of output is the third problem of the ADP system. While the standard division logistics system was designed *by* managers *for* managers, it is nonetheless relatively inflexible. We presume that it "knows" what every manager will need at any given time, and a flurry of reports documents this knowledge. Since many of these reports are used infrequently, there is a great waste of paper, creating additional logistics problems on the battlefield. And the manager still does not get all the information he needs.

The fourth problem is related to the separation of the computer from the warehouse. All major data processing for the division's logistics system takes place at division level. But warehouse inventories, PLL's, and other documents are located away from the supporting computer. The computer system that tells us what is in the warehouse is at one location and the warehouse with its actual inventory is at another. As one would expect, it is difficult to keep the record and the inventory synchronized.

The final problem of the current ADP system is that it lacks survivability on the battlefield. The logistics system is centered around one or two computer systems. On the battlefield, one or two well-placed rounds would totally destroy the entire division logistics system, reducing the combat effectiveness of the division.

Solutions to the problems

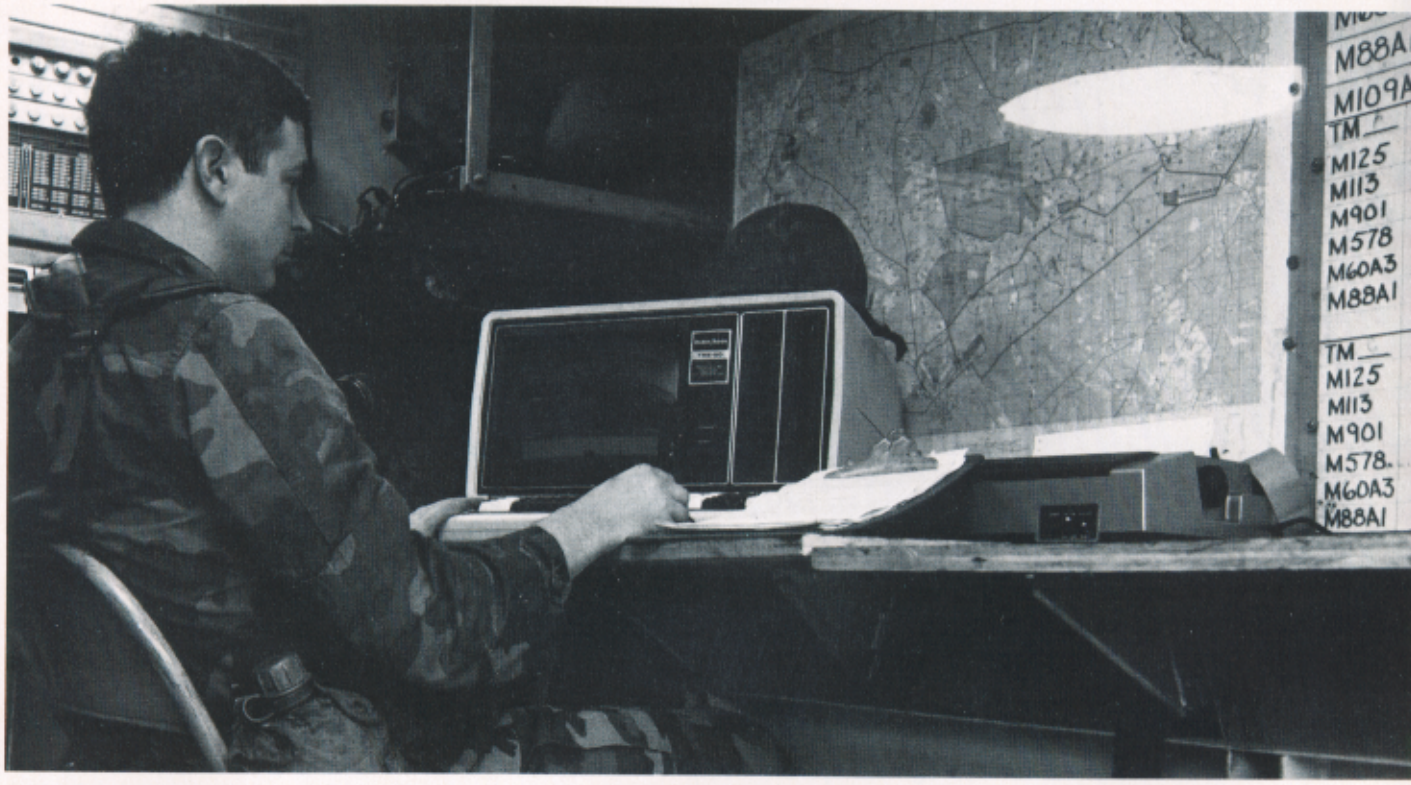
With enough resources, any problem can be solved. However, the Army does not have unlimited financial and personnel resources. Realizing this, the 24th Division challenged itself to automate the entire division's needs for less than the price of one M1 tank.

Whatever the solution a commander proposes, it must be able to work and survive on the battlefield. Not only must the individual elements of the system be reliable and maintainable, but also the entire system must be able to survive as long as the division can fight. Consequently, electronic data communications cannot be used, since battlefield data communications have not been perfected.

There are several projects underway at the 24th Division, some under the auspices of Project SMART that, when integrated, will yield a *total* solution for the division. Among these are—

TACOPS3. Starting at the bottom or unit level, the division is developing the tactical organizational paperless service support system (TACOPS3). It is a company-level, transportable, user-friendly system that can be used on the battlefield to automate logistics functions at the unit level. Software for the system was developed by the 24th Division, while the hardware used is surrogate, off-the-shelf microcomputer equipment.

TACCS. The tactical Army combat service support computer system (TACCS) is a transportable, user-friendly, commercially available, off-the-shelf computer and software system that can be used on the battlefield for combat service support missions at various levels of command down to, but not including, unit level. This is



Inside a field van, a soldier operates a computer of the TACOPS3 system.

an Army-wide project that is to be tested at Fort Stewart this year.

LOGMARS. The logistics applications of marking and reading symbols (LOGMARS) project represents the Army's entry into the bar-coding and bar-reading world. Since September 1981, LOGMARS technology has been tested at numerous locations, in numerous applications, and within several commands. A LOGMARS test is due to begin at the 24th Division in the near future. In the test, most of the supplies coming into the division will be bar coded. Items that are not already bar coded when they are received will be coded at that time. This means that once a part has entered the logistics system it can be tracked throughout the system with the bar-reading equipment.

DMS's. Data management systems (DMS's) are highly sophisticated retrieval systems. Most Army standard systems are inflexible in their presentation of output to a particular user. Normally, a new program must be written to give the user different, specialized information. An innovation in the ADP system will eliminate this problem in the integrated system.

The new program allows users to ask such questions as "How many?" "How much?" "Who?" and "Where?" Answers to the questions may come back as "one liners" or as 5,000-page reports. This innovation should help eliminate managers' frustration with the current inflexible output of computers. This DMS will run on DAS3, TACCS, and TACOPS3 equipment, so division personnel need learn only one system.

How the system works

Each PLL clerk will have his own microcomputer. It will have at least 128,000 characters of memory, a 1,000,000-character floppy disk drive, a 12,000,000-character hard-disk drive, and a 120-character-per-second-printer.

A listing of all functions of which the computer is capable will appear on the screen whenever the system is inactive. The system will be able to handle administrative, maintenance, training, word processing, and personnel functions once programed to do so. After the operator selects a broad category, more detailed information about that function will appear. Very quickly the system will be set up to perform his particular task.

Suppose a clerk wants to requisition a part. His first step will be to call up the supply function. "Request for issue" might be the clerk's response. The clerk will then be required to key in the national item identification

number (NIIN) or part number he desires. The system will respond with a screen display showing all the data elements required. All the information pertinent to the NIIN or part number and the unit to which he belongs will already be displayed. On the display there are only three data elements that must be entered—quantity, priority, and the vehicle number on which the part is to be installed or the purpose of the order.

All of the rest of the information is automatically recorded by the system, which includes the Department of Defense address code, Army master data file information, and requisition number. The system will also post the document register and generate a floppy disk record of this transaction. It will display on the video device the requisition in plain text to review for corrections. It can print a copy of the requisition on request, although such is not normally necessary.

When the clerk is ready to take the requisition to the warehouse he will have the requisition authenticated by using an authentication password that he inserts. Once the requisition is authenticated, a floppy disk will be generated that contains all the requisitions created that day, as well as any other pertinent information which needs to be passed up the line.

This floppy disk will be taken to the supporting direct support unit and inserted in their TACCS. The clerk will learn if the stock is on hand, and if it is, the part will be issued to him on the spot. Both the clerk's identification card and the parts will be scanned to ensure the right parts are being given to the right person. After the clerk's floppy disk is updated with the transactions, he will take the floppy disk and the parts back with him to his unit. At this point he will again scan the parts to ensure that no parts were lost in transit. Any requisitions for parts not available at the supporting direct support unit will be automatically passed to the computer system at the next level.

The system also will maintain the Army maintenance management system information, dispatch vehicles, and track repair parts for each vehicle. In addition, it has as built-in training system that allows a totally uninitiated person to become proficient in using the system with just 2 days of on-the-job training.

Test results

In May 1983, the unit-level TACOPS3 was installed at the 3/19th Mechanized Infantry Battalion. Since that time the error rate for input transactions has dropped from approximately 16 percent to 3 percent, with an anticipated error rate below 1 percent.

The transaction rate input capability has tripled, and the PLL clerks have far more time to perform other duties (such as the picking up of parts and puttting them into the PLL trailers) than they ever had before. They have taken this off-the-shelf hardware to the field twice, with no significant problems. It was taken with them during a rotation to the National Training Center.

Problems solved

As you can see, this system solves both the input and survivability problems. The edits on TACOPS3 will be as rigid as those of higher level systems. The computing power of microcomputers is so great that a division could lose more than half of its computers without experiencing a serious loss of the system's capabilities.

Because both TACCS and TACOPS3 are located with the appropriate warehouse and PLL stocks, were the TACCS or TACOPS3 system destroyed, then its respective warehouse or PLL probably has been lost as well. Moreover, since the TACCS will issue parts on the spot, any available supplies will be issued 1 day earlier than under the current system.

The problem of manual reentry of data into the system is solved by LOGMARS. Another advantage of the division's LOGMARS application is that it will give us an easy method of tracking all parts right down to the particular vehicle on which they are installed.

The DMS's solve the problems of inflexibility of output from standard systems.

The bottom line is that, once fully extended, the Army will have simple, error-free, survivable, flexible battlefield logistics for the first time. If the test at the 24th proves to be an effective solution to the problems at the PLL level, it may serve as the prototype for a redesigned division logistics system. Maybe the microcomputer is the "Salk vaccine" of the Army's logistics problems! ALOG

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