





Battlefield mobility

by Col. Charles L. Gordon

It is August sometime in the future, somewhere in a remote corner of the world. CSM Ulysses G. Clayton braces himself in the back of the vehicle as it speeds across the sand. The battalion commander, Lt. Col. Ben Reston, is riding shotgun in the front, talking on the battalion command net. The brigade FM squawks loudly and incessantly in the back. Clayton reaches over to the aux receiver and turns it down.

Reston turns toward his sergeant major: "Charlie Company reports enemy contact. They're taking small arms fire and mortar rounds. Let's check it out."

Clayton reaches for the handset of the Mobile Subscriber Terminal and pushes some buttons. Within a few seconds the brigade operations sergeant answers.

"Jack, this is Clayton. We've got enemy contact in Charlie Company's sector. Mortars and small arms. The Old Man and I are on the way there."

Clayton then dials the division G-2 to confirm enemy order of battle in the battalion's area of operations. Reston takes the phone when the G-2 comes on the line.

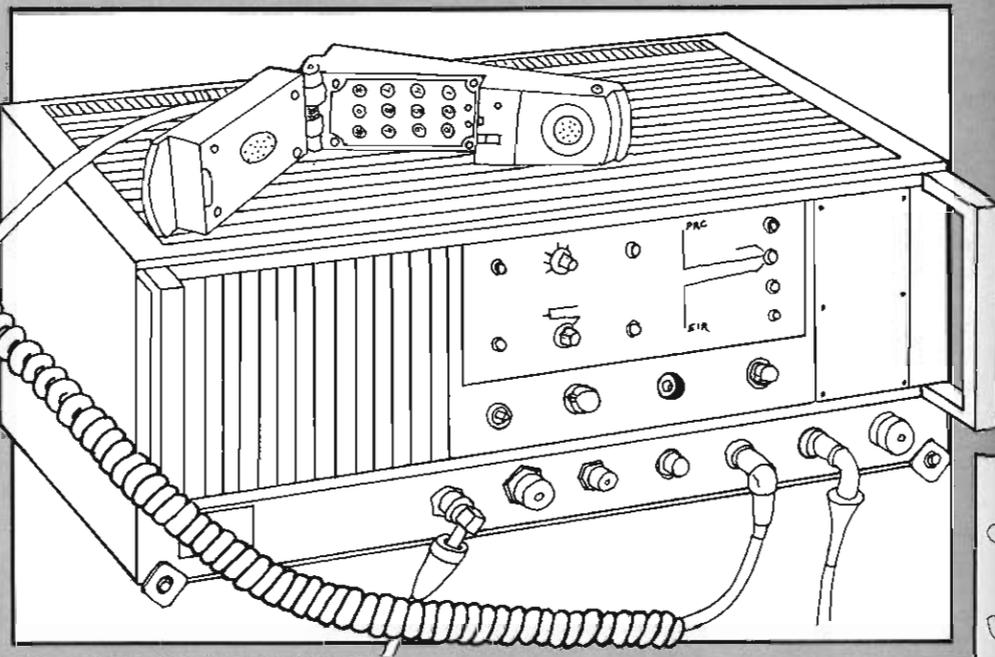
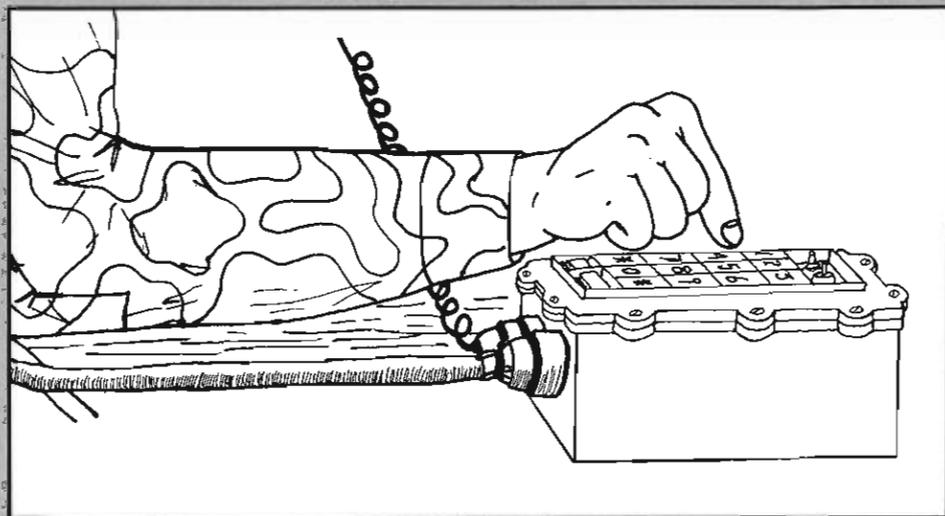
After giving Reston a quick run-down on the intelligence information

he has, the G-2 says, "Ben, I've got to go. I'm mobile right now, and we're just arriving at the division's new CP. This is the third time Division Main has moved in the last 24 hours."

Reston is not surprised. The brigade CP had moved twice during the night, and his own battalion has been constantly mobile all day long. As for his own CP — he's riding in it.

As they continue toward the fire-fight at Charlie Company, Clayton puts through three telephone calls in rapid succession: He calls AG at Division Rear to check on NCO replacements, he makes a conference call to the brigade and battalion S-1's to give an interim casualty report, and he calls the medical battalion to alert them to the possibility of medevacs from Charlie Company.

All of these calls are made on the move. Connection is accomplished automatically and takes only a few seconds. Every call is crypto secure and jam resistant. No radio procedures are required. The entire division is highly mobile. Although there is no multichannel radio relay system as we know it today, the division's telephone system works; it's reliable, flexible, and survivable.

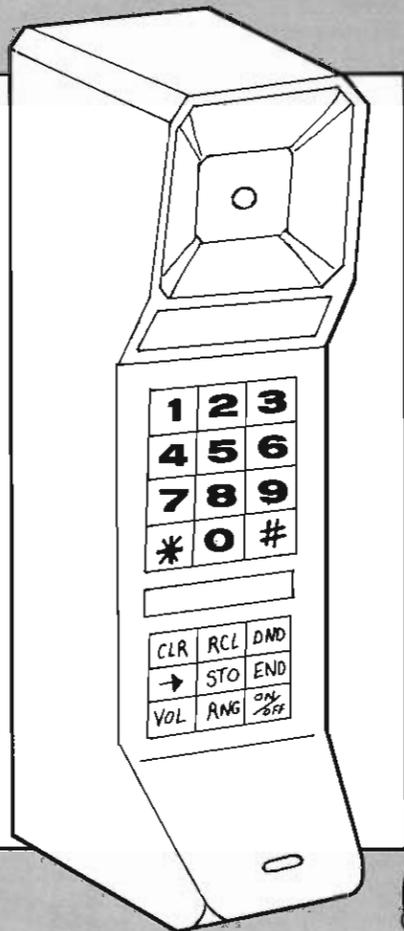


Illustrations by SP5 Cavin Carpenter

and "find" subscribers automatically, working around outages.

The US Army, on the other hand, has yet to begin acquisition of any kind of MSE system, although the need for one is clear. The way we do business today — tied to a multichannel umbilical cord and wired telephones — does not give us the mobility we need to avoid destruction of our major battlefield command centers. Multichannel radio relay simply can't keep up with the rest of the action.

Radio relay is the "backbone" of our present divisional communications system, but it is more cartilage than bone. We install multichannel nodes on hills near the CPs they service. The larger nodes may require as many as eight prime movers, and twice that many antennas and generators. Circuits are tied to the CP from "radio hill"



Impossible? Not at all. Mobile Subscriber Equipment (MSE) is not only possible before the end of the decade — it exists today. Chicago, Washington, D.C., and a few other cities already have cellular radio systems which utilize small, handheld radiotelephones. It is not uncommon to see a businessman on Pennsylvania Avenue talking over a telephone as he hurries to his next appointment. Granted, such systems are not secure, not militarized, and the current frequencies are not amenable to Army use. But commercial MSE-type systems are operational and have proven to be highly successful.

At least two other armies now have MSE-type systems. The British have developed Single Channel Radio Access (SCRA) equipment as part of their new PTARMIGAN tactical communications system. (PTARMIGAN is a digital system roughly analogous to TRI-TAC, our Joint Tactical Communications system.) SCRA is currently undergoing field trials in the United Kingdom and will be fielded soon. The French have already fielded a similar system, called RITA, in one of their corps. The French and British systems, which offer secure, mobile radiotelephone service to selected users, improve command post mobility by automating such functions as switching and circuit routing. They are self-organizing systems which keep track of user locations

by a manpower-intensive "down the hill" cable system which takes a considerable amount of time to install (and to remove). A wire and cable system is also used to connect all the telephones within the CP. All these cables come together in a patch panel where individual circuit routing is accomplished. A switchboard is tied into the system so that calls can be placed within the CP and to other CPs.

Once all the wires and cables are installed, the system is still very slow to become fully operational because switchboard and multichannel operators have to work their circuits in, one at a time. The patch panel becomes a tremendous bottleneck. Operators become frustrated when they are unable to get all the technicians on a circuit at the same time to troubleshoot it. Charges and countercharges are exchanged,

and the problem always seems to be "at the other end." Almost invariably, the CP will move before all circuits are installed, and the same laborious process begins all over again.

We cannot count on the enemy to be as sluggish in his efforts to locate our CPs. Multiple emitters which stay in one place too long make us extremely vulnerable to electronic warfare. Once they have located our communications nodes and CPs, the "bad guys" will waste no time putting steel on the target. Thus, we are forced to move several times a day if we are to survive. Our chances of staying alive will be even better if we can disperse operational elements within the CP.

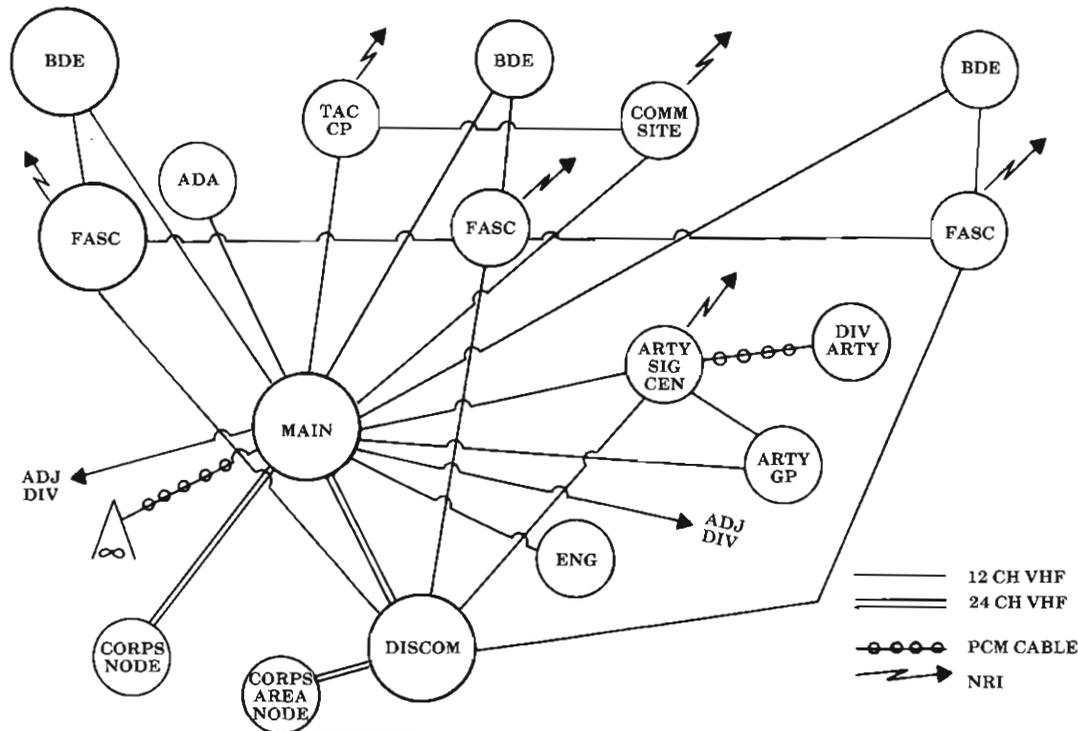
Mobile Subscriber Equipment can give us the mobility we so badly need. A full-fledged MSE system would replace today's divisional multichannel sys-

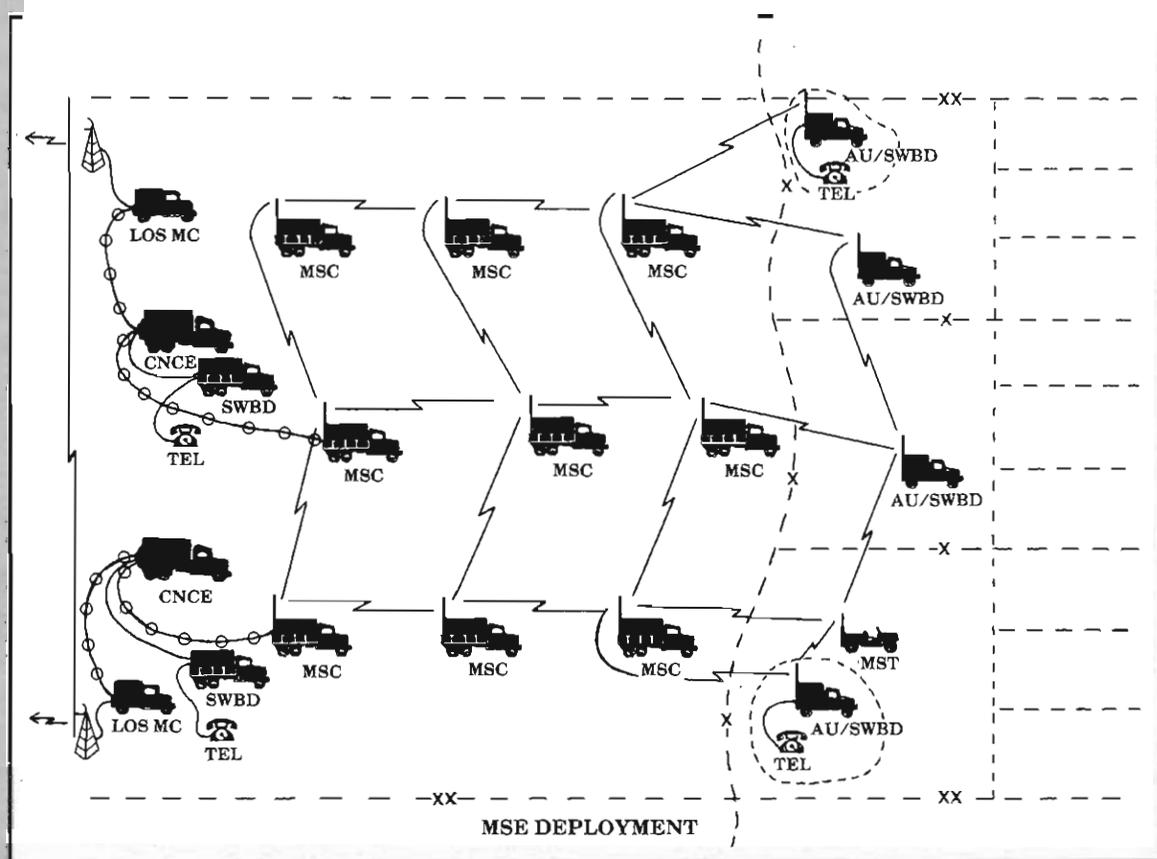
tem, using far fewer terminals and personnel by combining and automating functions. All communications between major CPs and the MSE system would be over radio, so the "down the hill" cable systems would no longer be necessary. MSE would be a self-organizing system, so patch panels would not be needed as before. The self-organizing aspect would eliminate the whole slow process of working in circuits, one at a time. Although a wire and cable system would still have to be installed within the CP, selected users with mobile radiotelephones would not have to wait on all this. These users would be in business all the time. With enough radiotelephones, even the internal CP wiring could be sharply reduced, giving us the ability to truly disperse the CP itself.

In 1976 the Signal Center com-



CURRENT DIVISION MULTICHANNEL SYSTEMS DIAGRAM





pleted a study which designed an objective architecture for the 1980s — the Integrated Tactical Communications System (INTACS). Mobile Subscriber Equipment was the linchpin of that proposed system at division level. The MSE requirement was then fully documented and an Operational and Organizational Plan was written. The objective system would consist of three functional end items: Mobile Subscriber Centrals (MSCs), Access Units (AUs), and Mobile Subscriber Terminals (MSTs).

Each division signal battalion would get nine MSCs, which would form a grid over the divisional area, replacing most of the multichannel system. Their function would be one of range extension, and they would interoperate with Access Units and Mobile Subscriber Terminals. Depending on the design, the MSCs might operate in an omnidirectional fashion, linking with several other MSCs over a single antenna. Radio relay systems between Division Main, Division Support Command, and Division Rear would be retained to insure adequate capacity.

The AU would be the interface between the mobile MSE system and the static telephone system. Each AU would consist of a data processor and

radios which would interoperate with both MSCs and mobile radiotelephones. AUs would be colocated with switchboards at the division's major CPs and operated by the switchboard operators. There would be about 25 AUs per division. The AU would combine the present functions of multichannel, cable, switchboard, and patch panel. It would be the critical element to insure full command post mobility. The operators would merely have to position the AU, put up the antenna, get the generator going, and turn on the radios. The CP would then be linked to the divisional MSE system through the nearest MSC. Static subscribers within the CP would still have to be wired into the AU, but they would have access to the rest of the division's telephones as soon as this was accomplished.

The MST would be the radiotelephone. About 160 commanders and key staff officers in the division would have one. The MST would be crypto secure, and it would be installed on various types of vehicles, operating on vehicular power. Each MST could be remoted, if desired, and could accommodate data, teletype, or facsimile traffic as well as voice. Each call would be discrete — that is, it would involve only the calling and called parties, unless

the conferencing capability was used. MSTs would be continually linked with the division's telephone system, either through MSCs or AUs. They would be able to talk to other MSTs or to anyone in the division who had a telephone.

Here's how the system would work: suppose a brigade commander were in his jeep and needed to talk to one of his battalion commanders. He would simply take the MST handset off-hook and "dial" the battalion commander's telephone number. The call would be picked up by the nearest MSC and switched automatically to the MST on the battalion commander's vehicle. If the battalion commander were not mobile, he would most likely have his MST remoted from his jeep to his static location, and the call would still reach him.

If the brigade commander were to dial someone on his own staff and were within range of his CP, the call would be picked up by the AU in the CP and automatically switched to the staff officer's telephone through the brigade switchboard in the AU. If he were not within range, the call would go through an MSC, then through the AU.

If he were to dial the division commander, the call would go through the nearest MSC, probably be switched

through one or more additional MSCs, and would automatically reach the division commander, whether he was mobile or in his CP.

Even though an MSE system would appear to be necessary to assure our survival in land warfare against an enemy with a reasonably sophisticated electronic warfare capability, the Army has not yet decided to acquire it. There have been a number of barriers over the years since INTACS. At first, the technical feasibility and the need were strongly questioned. Other solutions, such as Net Radio Interface (NRI; formerly Radio Wire Integration, or RWI) were proposed. However, a Department of the Army decision recently revalidated the need for MSE, so the requirement hurdle appears to have been crossed. Various acquisition strategies have been debated, with proposals ranging

from off-the-shelf solutions to a relatively lengthy developmental program.

Perhaps the greatest barrier to an acquisition decision is simply money. MSE is currently an unfunded program. There is no question that MSE would be very expensive in terms of dollars. In terms of personnel and equipment, however, it would be a great cost saver in the long run. In any case, battlefields are inherently not cost effective. If we are to live to fight on the future battlefield, this is one bullet we're going to have to bite.

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