Desert Navigation Devices

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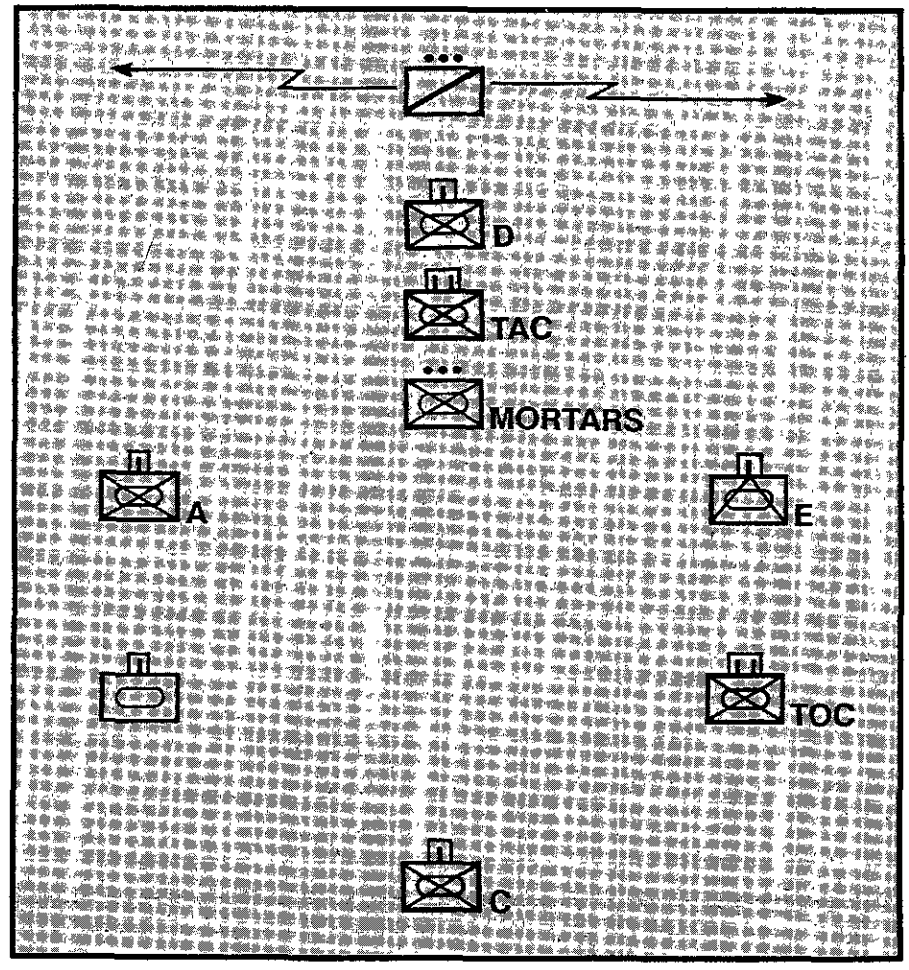
Two articles on desert navigation have appeared in INFANTRY during the past year, and both helped the units in Operations DESERT SHIELD and DESERT STORM find their way into Iraq. *(See "Desert Navigation," by Major Richard G. Reynolds, July-August 1990, pages 18-23, and "The Middle East: A Traveler's Guide," by Charles L. Black, PAST TIMES, November-December 1990, pages 28-31.)* Neither of them, however, addressed the use of the electronic navigation aids that many units were issued in Saudi Arabia — the Global Positioning System (GPS) and the LORAN (a long-range radio position fixing system). The experience of one battalion task force — 2d Battalion, 18th Infantry — may prove helpful to other units.

The task force was issued two handheld LORANs just before deploying to Saudi Arabia. Initially, commanders, staff officers, and several soldiers in each company were trained to use them. They became task force property and were maintained by the S-3. They could be signed out by companies for particular training requirements and familiarization. Several more trickled in during DESERT SHIELD and by the start of the ground war every commander and staff officer had one and could operate it effectively.

Before the ground war started, the task force also owned five GPS devices. One, which had been issued in September 1990, was inoperable and no repair facility was available. The remaining four systems were issued to the mortar platoon, the scout platoon, the S-3, and the commander of Company D. They were so allocated for reasons related to the task force's mission, movement formation, and navigation plan.

The task force was part of the 24th Infantry Division; its mission was to drive from the Saudi Arabian-Iraqi border to the Euphrates river valley — some 370 kilometers in all. Because of the great distance, the lack of visible terrain features, and the imposed time constraints, navigation was critically important. The task force commander decided to proceed on a series of azimuths within his sector and, when possible, to follow existing trails to make route navigation easily understandable to every soldier involved. The task force moved in a box formation as depicted in the accompanying diagram.

By assigning each person with a GPS specific duties and responsibilities, the commander ensured that the available GPS devices were used to best advantage.



The scouts were responsible for forward reconnaissance, and for reporting the task force's frontline trace during movement. Obviously, since they could then be assigned to do a flank reconnaissance mission or could even be detached, it was crucial for the commander to know where they were at all times.

Company D, the advance guard, was responsible for keeping the main body of the task force on course. Because the company could not always keep visual contact with the scouts, its requirement for GPS was also justified. Every ten minutes (while moving), the company commander reported his current eight-digit grid on the task force command net. Other commanders and the TF staff officers, by understanding their position in the formation relative to the Company D commander, could then do a resection to find their own positions.

To aid visual identification, the company command track displayed an orange VS-17 panel on its rear door. This allowed anyone on the command net who could see that vehicle to identify it quickly before it moved from the grid location it had reported. The TF also had a contingency plan that called for the lead vehicles to drop green hand-smoke at grid locations to help those furthest back, but this never proved necessary.

Concerns about the amount of extra radio traffic on the task force net did not become a problem. The S-3 moved with the tactical command post and acted as backup for the commander of Company D. He was also the mobile GPS moving to any special spots such as TF release points.

The mortar platoon leader used his GPS for gun emplacement and for task force navigation when other systems had problems with signal strength. During movement, LORAN was used only to augment and verify the accuracy of the GPS. Several companies that had specific missions at march objectives, though, used LORANs without GPS verification.

The reliability and accuracy of the two devices varied. Since the GPS receives its data by satellite, it was subject to satellite availability. Normally, the satellites were on station about 20 hours a day, while LORAN, based on a ground transmitter system, was almost always available. GPS was much more accurate than LORAN but less available. GPS can be powered by an internal battery or a vehicle battery through an external power cord. The internal batteries, which were special ones, presented a problem in that none were available on the local market.

Only severe dust storms seemed to affect the accuracy of LORAN readings. Unlike GPS, though, anyone setting up LORAN to read particular ground stations had to have a working knowledge of the particular LORAN model he was using. Three ground stations were programmed into the device on the basis of which part of the country a unit was operating in. The LORAN then triangulated its position from those stations' signals. The whole process was complicated by the quietly announced closure of a key station near the Kuwaiti-Saudi Arabian border because of the war. That problem was eventually solved by omitting the closed station from the programmable station position list. LORAN then became a good tool.

Later models were issued with a built-in program to convert latitude and longitude readings to military grids. In addition, the LORAN could be operated with either 9-volt or AA batteries; local purchase and personal stereos provided a steady supply.

To augment both of these electronic systems, all companies had at least one platoon leader or squad leader reporting his position regularly from map and compass readings. Distance was determined by an odometer average, but the lack of terrain relief in the desert and map inaccuracy limited the effectiveness of this method over long distances.

There are many ways to use LORAN and GPS. Both are good tools, particularly suited for desert navigation and its inherent constraints. Leaders should be careful, though, not to let their soldiers rely solely upon electronic navigation. Because these devices are so simple to use, it is easy for someone to let them do all of the navigating while he just reads number displays. This is especially true when it comes to plotting way points and letting LORAN or GPS give heading corrections. In terrain where relief is more prominent than it is in the desert, small unit leaders should navigate with maps and compasses and use electronics only to verify their locations. Not only does this give them practice in navigating, it also teaches them to become familiar with the ground in case they become separated from their maps.

This battalion task force's experiences in Southwest Asia demonstrated that the GPS and LORAN are effective devices for navigating in the desert.

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