

The Moving Call for Fire

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Indirect fire support has always been a key element in maneuver warfare, and using computer technology to refine the fire support system will make the artillery a more effective killer on the Force XXI team. One of the most difficult missions for a fire support officer (FSO) is to engage moving formations of armored vehicles. In the defense, this requires emplacing a physical trigger point on the ground, which indicates when to call for fires.

Calculating a trigger point requires only that the FSO enter information into a simple formula, thereby computing the distance from the target to the trigger point. The formula is: time of flight in seconds plus estimated mission processing time in seconds times the enemy's estimated rate of march equals the distance from the target to the trigger point.

To mark the point, the fire support team (FIST) measures the distance on the ground from the target to the trigger point. At the trigger point, the FIST builds something that is visually recognizable from its overwatch position.

This procedure works fairly well at the National Training Center, where the enemy frequently follows a predictable course of action. Unfortunately, not all adversaries pass close to the trigger point, which forces the FIST to estimate when to fire the target. Even if the enemy does pass the trigger point, there is still no guarantee that the fire mission will arrive on target at precisely the right time. Two of the three factors in the formula are estimates—the enemy's rate of march and the mission processing time. The only factor that doesn't usually change is the time of flight, and even this one does when the firing unit has to repositi-

tion. There are simply too many variables in this formula to permit accurate prediction.

Using FIST equipment—a precise lightweight GPS (global positioning system) receiver (PLGR), a ground vehicular laser locator designator (G/VLL-D), and a digital message device (DMD)—it is possible to determine the enemy's location within ten meters and provide a snapshot of it. If the FIST equipment automatically attached a PLGR time to the target location, then all the FIST would have to do is lase the same target twice. Using a simple mathematical formula (Rate times Time

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equals Distance), the computer uses the time it takes for the target to move between two known points to calculate the direction and actual rate of march. The FIST would send this information to the fire direction center (FDC) in a digital message format that could be called the "moving call for fire" (MCFF). The time factors the FIST attached to the MCFF would be identical to the time on the clock in the FDC computer, because both would run off satellite time.

The FDC would receive the MCFF and store it in its buffer. While members of the FIST waited for the FDC to process the mission, they could send updates to the FDC to keep the mission accurate (location, direction, and speed). When the fire mission

reached the top of the buffer, the computer would calculate the mission. The computer would take the most current updates to the MCFF and calculate target location at mission processing time plus time of flight. This calculation would take the computer less than one second. This information would then be converted into firing data and sent to the guns. The guns would fire the mission and—ideally—hit the moving target.

The MCFF provides a moving picture of the enemy, which reduces the need for emplacing physical trigger markers in the engagement area. The MCFF requires that the computer have all the fire control measures and boundaries entered into its database, as well as positions of friendly units, to prevent fratricide. Eventually, maps would be a part of the FDC computer data base, allowing the computer to calculate altitude as well. The system could also incorporate the enemy template and friendly obstacles. Final revisions could incorporate the terrain and enemy situation template into its prediction formula. It could also compensate for the amount of time it is likely to take the enemy to breach obstacles.

The battlefield of the next century will be more deadly than ever, and using the moving call for fire will help the units of Force XXI maintain one more technological advantage over their enemies.

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