

# THE MORTAR FIRE CONTROL SYSTEM

DAVID SUPER AND TRAVIS KUNDEL

In 2004, the M95/M96 Mortar Fire Control System (MFCS) was fielded to the 1st Cavalry Division in support of Operation Iraqi Freedom (OIF) II. The M95 MFCS is used with the 120mm mortar vehicle and primarily consists of the commander's interface computer, gunner's display, driver's display, and a navigation suite. The M96 MFCS is used in the fire direction center (FDC) and consists primarily of the commander's interface computer. The system gives the battalion's mortar platoon increased overall accuracy, responsiveness, survivability, and lethality. MFCS allows the battalion's heavy mortar platoon to perform technical fire direction via the commander's interface computer. This digitalized system lets MFCS integrate into

the digital fires network through the existing SINCGARS radio suite. MFCS is compatible with the Advanced Field Artillery Tactical Data System (AFATDS) and the Force XXI Battle Command Brigade and Below (FBCB2). MFCS uses an accurate pointing device which eliminates the need for aiming posts and sights as the primary method of lay. The driver's display allows the driver to rough lay the mortar carrier. Finally, the gunner's display lets the gunner know where the mortar tube is actually laid. MFCS is currently fielded in the M1064A3 Mortar Carrier (M113) and M1129 Stryker Mortar Carrier.

MFCS can conduct final protective fires (FPF), precision registrations, grid, polar

plot, and shift missions. It conducts fratricide checks, stores meteorological messages and safety fans as well. MFCS allows the FDC to quickly and accurately change sheafs to fit the tactical situation. These sheafs include linear, open, parallel, converged, and special sheafs.

MFCS first saw operational experience in the battles in Najaf and Fallujah in 2004. In all instances, MFCS gave the maneuver commanders confidence in the system. One battalion fire support officer said the 120s (MFCS) were so good, that the Marines requested 120mm mortar support in lieu of using their own organic 81mm mortars.

All interviewees were impressed with the accuracy of MFCS. One company commander reflected upon his unit's conduct of a deliberate attack when they

received more enemy resistance than expected.

The unit, pulled back and called in the battalion's 120mm mortar platoon. He

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Courtesy photo





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was amazed at the accuracy of the MFCS. The mortars destroyed the enemy position within meters of the target location. In Najaf, one maneuver platoon leader commented that within a round or two of adjustment on a target of opportunity, the mortars accurately converged on the targeted building with great success. MFCS significantly reduces the circular error probable (CEP) of the 120mm mortar systems. One of the capabilities of MFCS is the use of meteorological conditions (MET) to account for nonstandard conditions. This allows MFCS to be more accurate. One mortar platoon leader said, "...with a good MET it has been steel on target for us." The same platoon leader said, "We have primarily fired illum missions with it, and the sheafs have been picture perfect." Another Soldier said, "MFCS allows for greater accuracy than we've ever had and that equates to immediately suppressing and destroying the enemy."

MFCS enhances responsiveness for maneuver commanders, especially with the ability of the system to conduct hip shoots in less than a minute. In Fallujah, mortars were extensively used, in part because mortars are the battalion commander's organic fire support system. Additionally, with howitzers located more than 10 kilometers away, communications were difficult, especially when conducting urban operations. Artillery's role was further complicated by its tactical mission of general-support reinforcement, which slowed responsiveness. MFCS allows the maneuver commander to receive fire for effect in a substantially less amount of time than through the previous method of fire control which required use of a plotting board, aiming posts, and sight units.

Survivability is increased by use of MFCS. The ability to conduct hip shoots in less than minute means not only can the mortars emplace in a short amount of time, but they can also displace quickly. If a fire direction center is taken out of action, any gun can easily fulfill the FDC role as required.

Several Soldiers commented that the lethality of the 120mm mortar was excellent, especially in an urban environment. Improved accuracy results in less time taken to adjust rounds provided the observer's target location is accurate. Numerous

Soldiers commented they preferred using 120's in urban operations because of its accuracy compared with 81mm or 60mm mortars. MFCS has enabled the 120mm mortar to become more lethal based on its improved accuracy, responsiveness, and survivability. While MFCS has enabled 120mm mortars to become much more effective and accurate, the system will not make 120mm mortar ammunition precise enough to destroy high value point targets with minimal collateral damage. For these applications against lightly armored vehicles, bunkers, and buildings, where "one shot, one kill" is required, mortar users still need the Precision Guided Mortar Munition.

The Mortar Fire Control System is managed by the office of the Product Manager (PM) for Mortar Systems. In response to the 1995 MFCS Operational Requirements Document (ORD), PM Mortars developed an evolutionary development strategy to field the full required functionality. The MFCS hardware was baselined when the system was type classified standard in April 2003. The full functionality of the MFCS software will be achieved through development and release of 5 Versions of software. Because MFCS is a core system in Army Software Blocking (ASB), releases of MFCS software versions are accomplished concurrently with ASB releases. MFCS Version 4 is slated to be released with Army Software Block 2 in FY 2007. Through Version 4, MFCS software incorporates: all basic mortar firing missions, digital MET, interface with FBCB2, fire support coordination measures, digital communication, the NATO ballistic kernel, and the ballistic kernel for the most recently fielded U.S. mortar rounds. MFCS Version 5, which will be released with ASB 3, will incorporate all of Version 4 plus multiple safety fans, search and traverse, the XM395 Precision Guided Mortar Munition, and the dismantled 120mm MFCS.

The MFCS program is fully funded and will be fully fielded by the end of FY 2008 to all heavy and Stryker brigade combat teams in both the active force and National Guard. PM Mortars is currently qualifying a dismantled variant of MFCS which will be integrated with the M120 120mm towed mortar. This MFCS variant, called the XM150 Dismounted 120mm MFCS, will be used in conjunction with the M1101 trailer and the Quick Stow device which will be mounted on the trailer. The Quick Stow will enable the mortar crew to rapidly emplace and displace the M120 towed mortar. Qualification of the dismantled 120mm MFCS will be completed in early FY 2008. Fielding of this system to infantry brigade combat teams will begin in FY 2009. The XM150 Dismounted MFCS will enhance the IBCTs ability to deliver more accurate, responsive, and lethal 120mm mortar fires.

Honeywell Aerospace Electronic Systems in Albuquerque, New Mexico, is the systems integrator responsible for systems procurement, staging, and fielding. The Life Cycle Software Engineering Center, located at the U.S. Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, New Jersey, is responsible for software development.

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**David Super** is the Deputy Product Manager for Mortar Systems, at Picatinny Arsenal, New Jersey.

**Travis Kundel** is employed by Honeywell Aerospace Electronic Systems and works on-site in the Office of the Product Manager for Mortar Systems.

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