

What the Commander Needs to Know About Guidance in AFATDS

By Colonel James G. Boatner, Jr.

Fielding of the Advanced FA Tactical Data System (AFATDS) began in 1997 and has continued throughout much of the Active Component (AC) and into the Reserve Component (RC). (See the article “ARNG [Army National Guard] Fielding AFATDS” by Major Richard H. Owens III in the January-February edition.)

The newest software version of AFATDS, Version 6 (formerly called A99), includes technical fire direction capabilities and will begin fielding in April and go through the summer of

2003. Ultimately, Version 6 will displace legacy digital systems, such as the battery computer system (BCS) in cannon units and the fire direction system (FDS) in rocket and missile units. (See the article “AFATDS Gunnery: Technical Fire Direction” by Major A. J. Williams in this edition.)

As units train to build proficiency with a new, more capable fire support digital system, one consistent challenge for leaders has been the ability to manipulate AFATDS guidance settings—often called “guidances”—to most effectively

support the maneuver commander’s intent and concept of the operation.

This article suggests specific areas within AFATDS guidance that are important enough to require the maneuver commander’s or fire support coordinator’s (FSCOORD’s) approval—“Commander’s Criteria,” to use an old tactical fire direction system (TACFIRE) term. The TACFIRE “Commander’s Criteria” referred to a six-message set that allowed specific criteria to be established for attacking a target, including volume of fire and the selection of fire units and shell/fuze combinations. The implication was that the commander personally approved the criteria set in these messages.

Guidance in AFATDS is key to exploiting automated capabilities to plan, clear and execute fires to accomplish the commander’s intent. AFATDS guidance components fall primarily into the two broad areas of target management and attack analysis. The guidance affects all AFATDS operations but none more than fire mission processing.

Properly using the guidance settings allows for increased automation and consistently predictable results. This predictability will bring a degree of confidence in AFATDS’ ability to as-

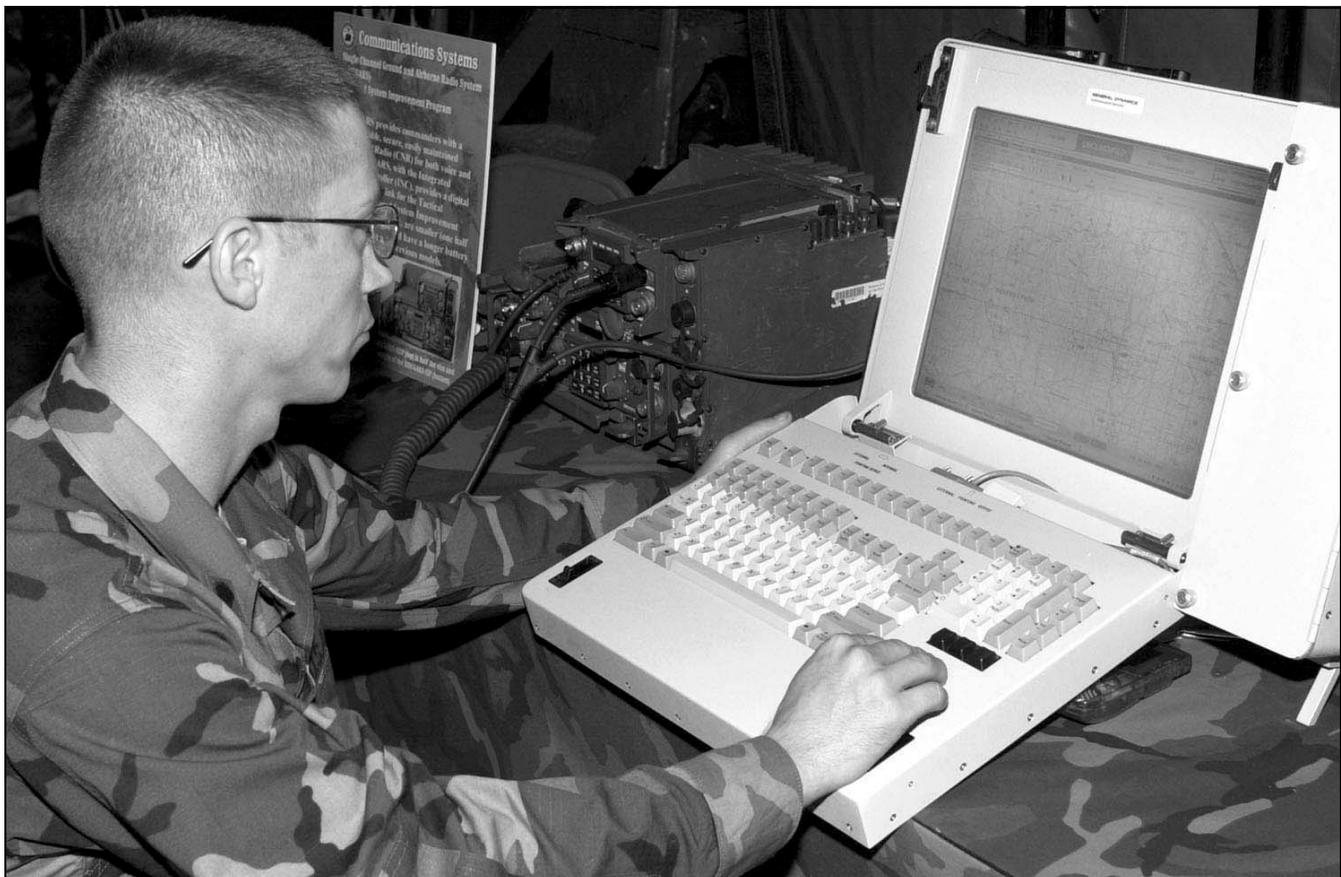


Photo by PVT. Travis Burnham

sume some of the routine processing jobs that soldiers have accomplished in the past. This confidence also should encourage commanders to process fire missions with less human intervention.

It is critical to our digital fire support systems that the AFATDS guidance settings are uniformly established and disseminated throughout a unit. Once loaded in AFATDS, the guidance settings can be distributed digitally via AFATDS or transferred using an optical disk or other archival device.

In the 4th Infantry Division (Mechanized) at Fort Hood, Texas, the Army's first "Digitized Division," the division fire support element (FSE), in concert with the division artillery fire control element (FCE), publishes and disseminates a digital attack guidance matrix (DAGM). The DAGM is part of the division's fire support annex and augments or modifies AFATDS guidance as determined in the 4th Division's tactical standing operating procedures (TACSOP). This DAGM includes detailed information related to the AFATDS guidance settings and was discussed in the article "Reactive Targeting: Firefinder and AFATDS in the Digitized Division" by Chief Warrant Officer Two Eric J. Moran and Lieutenant Colonel Dominic D. Swayne in the May-June 2001 edition.

During AFATDS fielding, it is critical units develop a AFATDS or digital annex for their TACSOPs. The commander should be involved in developing this annex. It serves as the play book for digital operations and builds expertise and continuity within a unit—including the guidance settings. See Figure 1 for a sample AFATDS annex for a unit TACSOP.

Commanders need to influence other specific components of AFATDS guidance, including mission prioritization, the target management matrix (TMM), fire support buffer distances, FA restrictions and attack methods. Also, commanders should approve AFATDS mission intervention rules. Mission prioritization and the TMM are probably the two most important components of AFATDS guidance that a commander must review and approve.

Mission Prioritization. The settings in this window determine how AFATDS prioritizes incoming missions. See Figure 2 for an AFATDS screen capture of a sample "Mission Prioritization" window.

AFATDS does not simply process missions first-in, first-out. It ranks the

ST 6-3-1 AFATDS Digital Leader's Guide, dated February 2001, includes a sample AFATDS TACSOP and detailed sections on digital operations with AFATDS: fire mission processing, fire mission planning and guidance. An appendix on advanced AFATDS tasks provides additional information and a discussion on the use and management of the AFATDS guidance settings.

ST 6-3-1 is a good reference for mid-grade officers or NCOs with limited experience with AFATDS. It is available on line at the Training and Doctrine Command (TRADOC) System Manager for FA Tactical Data Systems (TSM FATDS) home page at www.army.mil/tsm_fatds in the "Documents Library" portion of the menu.

Figure 1: *Special Text (ST) 6-3-1 Advanced Field Artillery Tactical Data System (AFATDS) Digital Leader's Guide* with a Sample of an AFATDS Annex for Unit Tactical Standing Operating Procedures (TACSOP)

missions and determines an overall mission value based on four parameters: target type, on-call targets, priority of fires and targeted areas of interest (TAIs). These four parameters can be ranked from one through four in importance or be assigned relative weights using slip scales next to each parameter. The "Reactive Targeting" article already mentioned includes a section called "AFATDS Primer" that gives a concise description of AFATDS' mission prioritization.

Essentially, a mission value is calculated for each mission on a 0 to 100 scale. This allows an AFATDS operator at an FSE or fire direction center (FDC) to select the most important mission or target in queue (a high-value mission) to be processed next.

Figure 2 shows an example of a weighted mission prioritization scheme where the "Target Type" is weighted heaviest at 70 percent, "Priority of

Rank	Parameter	Weight
1	Target Type	70
2	On-Call Tgts	0
3	Priority of Fires	20
4	TAIs	10

Assign Value by: Rank Weight

On-Call Targets have higher priority

Rank	Unit ID
1	FSE TF 1-10M 3BDE 23CVD
2	FSE TF 5-85AR 3BDE 23CVD
3	FSE TF 8-28AR 3BDE 23CVD

Rank	TAI
1	SILVER
2	GOLD

Fire Mission Cutoff Values:

- FA Cannon: 20
- Rocket/Missile: 30
- Mortar: 10
- Air: 35
- Aviation: 35
- NSFS: 35

Figure 2: Mission Prioritization Window. The top left section of the screen shows the "Target Type" weighted 70 percent, "Priority of Fires" weighted 20 percent and "TAIs" (targeted areas of interest) weighted 10 percent for a total of 100 percent.

Fires” second at 20 percent and fires in planned “TAIs” as third at 10 percent. These weights are used to calculate an overall mission value that is a weighted average of the relative values of each parameter associated with that mission. In this example, if a target is a high-payoff target (HPT) from a unit with priority of fires (as established in the “Priority of Fires” box) or is in a key TAI (as established in the “Targeted Area of Interest” box), it will receive a relatively high mission value and be fired before other lower priority missions.

If mission prioritization parameters are ranked, then mission prioritization by AFATDS is straightforward. For example, if “Priority of Fires” is ranked one and “Target Type” two, then AFATDS will process missions sent by observers supporting the units listed in the “Priority of Fires” box first—i.e., Task Force (TF) 1-10 (Mechanized), 3d Brigade, as shown in Figure 2. This may be appropriate when one TF in a brigade is leading an attack or movement-to-contact. In general, HPTs sent by other units would be fired next.

If “On-Call Tgts” were ranked first, then specific targets from the on-call target list could be designated as having the highest priority.

The “Mission Prioritization” window also can set a minimum mission value that a fire request must meet before AFATDS will consider using a specified attack system. Mission values are set in the “Fire Mission Cutoff Values” box. Generally, cutoff values are lower for mortars, cannons or rockets and higher for more valuable or scarce attack assets, such as missiles and air or naval fire support. Setting fire mission cutoff values can prevent a high-value asset from being considered for a lower priority (or value) mission or target.

Clearly, the commander must understand how AFATDS prioritizes fire missions and the use of attack systems. He must be involved in making decisions about how AFATDS will be used to set his priorities for fires.

Target Management Matrix. This window allows the maneuver commander or FSCoord to specify those HPTs (from the high-value target list, or HVTL) that are the fire support priorities for a particular operation. See Figure 3 for a sample TMM screen capture.

“Target Types” are designated in the “High Payoff Targets” box with each assigned a mission precedence (when the target will be attacked) and the ef-

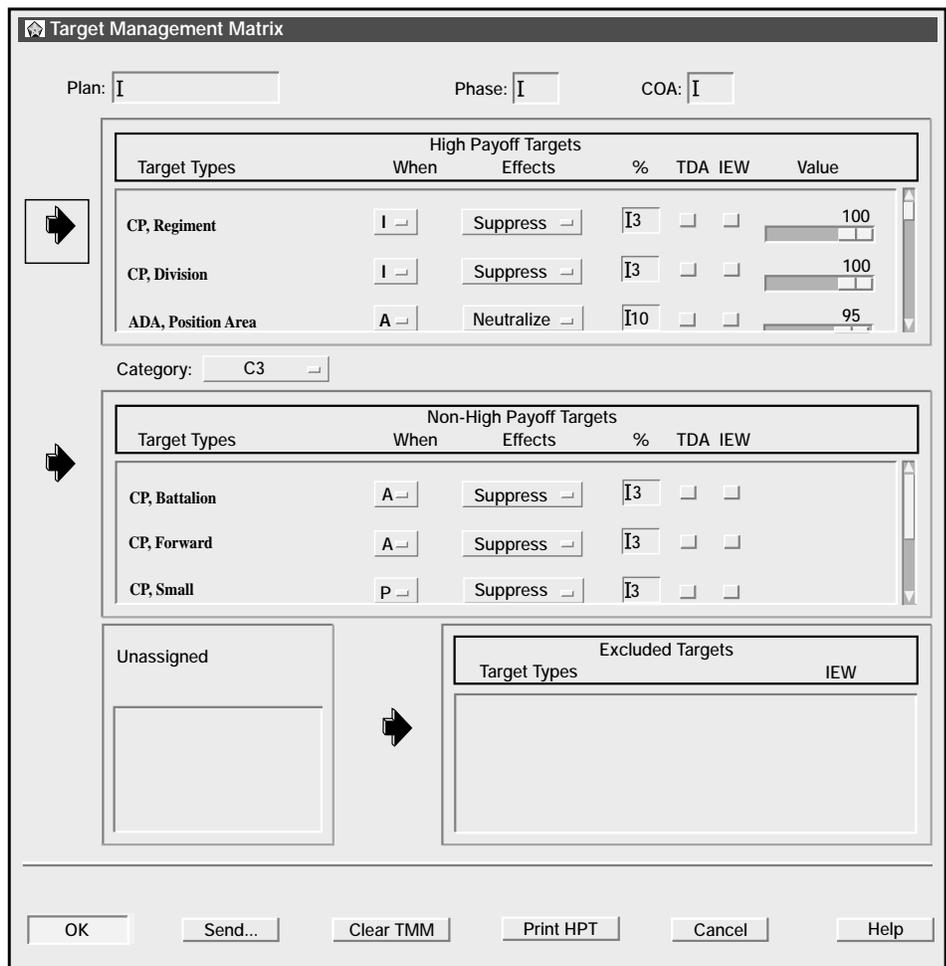


Figure 3: Target Management Matrix. The attack precedence for “Target Types” is “I” for Immediate, “A” for As Acquired (fired after “I” targets) or “P” for Planned.

fects desired against the target. Again, a slip scale is available to establish the relative weight of each target.

The most important HPTs should be assigned an “I” for Immediate precedence—only priority targets (final protective fires and Copperhead) will be fired before “I” targets. “A” or As Acquired targets are fired after Immediate targets in accordance with their calculated mission values. This HPT list (HPTL) also should reflect which targets require coordination for target damage assessment (TDA) or intelligence and electronic warfare (IEW).

The TMM also has an “Excluded Targets” box that the commander needs to approve. Adding targets to the HPTL or excluded list is done using point and click functionality.

The targets in the “Non-High Payoff Targets” box automatically include all target types from the HVTL that are not placed in the “High Payoff Targets” box.

Fire Support Buffer Distances. A buffer distance is the effects distance added to the target aim point in AFATDS

to determine if a fire support coordinating measure (FSCM) violation has occurred. Buffer distances are established in the initial setup of AFATDS and can have a significant impact on clearance of fires.

AFATDS performs a doctrinal clearance of fires check of each mission by comparing the target location to current FSCMs. If an observer is calling for fires into his unit’s zone, then it is implied that he has cleared the mission or has “eyes on” the enemy target.

Fires called into another unit’s zone, across a restrictive FSCM or short of a permissive FSCM will generate a yellow gumball in the mission intervention window and a digital clearance request to the unit that established the FSCM that has been violated.

In digital systems, it is important to realize that a zone of responsibility (ZOR) defines the area that represents the sector or zone that a maneuver unit owns. Boundaries, forward-lines-of-own troops (FLOTs) and friendly unit symbols do not cause coordination requests. As the live feed of friendly force

locations generated by the Force XXI brigade and below battle command (FBCB²) system in digitized units matures and improves, a friendly unit check will be implemented in a future update of AFATDS.

Commanders should establish and approve effects buffer distances in AFATDS. *ST 6-3-1 AFATDS Digital Leader's Guide* recommends 300 meters for a cannon/rocket buffer and 500 meters for air.

During the 4th Division's recent Division Capstone Exercise II at Fort Hood, the 4th Division Artillery commander used minimum safe distance (MSD) buffer distances of 600 meters for cannon missions and 2,000 meters for multiple-launch rocket system (MLRS) missions due to very restrictive rules of engagement (ROE) for a populated urban environment. Although this generated many more clearances of fires requests, civilian casualties were minimized throughout the fight and the maneuver brigade commanders felt they had responsive fires with adequate controls in place.

FA Restrictions. This window is used to prevent specific units from firing certain shell/fuze combinations. There are also maximum fire units and maximum volley restrictions that impact massing fire solutions in AFATDS.

Maximum fire units should be equal to the number of firing units controlled by the unit listed (i.e., six firing platoons for an FA cannon battalion). If high maximum volleys are inputted, then fewer fire units will be required to achieve the effects on a target. Therefore, to achieve massed fire solutions in AFATDS, maximum volleys are set relatively low (i.e., six volleys) and maximum fire units are set high.

Attack Methods. Commanders may have strong preferences as to how to attack particular HPTs. AFATDS includes attack method tables for all possible available fire support attack systems, including cannons, rockets/misiles, mortars, air and naval surface fire support. The commander can specify guidance settings for the shell/fuze and volume of fire for a particular weapon system for any target, called a "volley" target.

"Effects" targets should have the desired effects specified in the "Target Management Matrix" window as percentages in the "High Payoff Targets" or "Non-High Payoff Targets" boxes (see Figure 3) and no entry in the attack methods table. AFATDS will use its

joint munitions effectiveness manual (JMEM) tables in its data base to determine an attack solution that achieves the desired effects.

AFATDS also has an effects calculator in the "Mission Processing" window. This is used during planning to determine what effects percent can be achieved by a given number of volleys from a weapon system (or munition) against a specific target type.

Mission Intervention. Although technically outside the realm of guidance settings, the use of intervention rules and intervention points (IPs) in AFATDS is another area that deserves the commander's close scrutiny. The streamlined use of IPs in FSEs and FDCs is essential to efficient fire mission processing.

Simply put, responsive fires cannot be provided if IPs are allowed to default to "All" at every fire support node. AFATDS will allow the operator to view and make decisions on any mission received at an FSE or FDC; however, management by exception should be the goal for mission intervention.

Commanders should strive to tailor IPs to stop specific types of missions (or targets) for operator or leader review at intermediate fire support nodes while allowing other missions to automatically process through the fire support system to a firing unit for rapid response.

When an "Intervention" window is opened in AFATDS, the operator will be given a recommended attack option that quickly can be accepted, rejected or modified. All other attack options also are displayed. (See the article "AFATDS Gunnery: Technical Fire Direction" for screen captures of "Intervention" windows.)

Figure 4 shows the categories for establishing IPs within AFATDS. An intervention rule can include criteria from any or all of these categories. For example, an intervention rule could be established for all missions with a precedence of "A" (As Acquired) and an AFATDS mission value of less than 50. This will allow "P" (Planned) and "I" (Immediate) missions plus "A" missions with high mission values (above 50) to process automatically, but it would require an operator to review and approve low value "A" missions.

The 4th Infantry Division uses four standard IPs and adjusts them based on the tactical situation and dry fire AFATDS mission values generated

during planning and wargaming. The four IPs are targets requiring coordination, targets with an AFATDS "Deny" recommendation, "I" (Immediate) precedent missions of a specified value (based on DAGM-calculated dry fire mission) and "A" (As Acquired) precedent missions of a specified value (based on DAGM-calculated dry fire mission).

Mission Precedence
Priority
Immediate
As Acquired
All
Munition Category
By Type
All
Filters
Target Selection Standards (TSS)
Duplication
Exclusion
Intelligence and Electronic Warfare (IEW) Routing
Target Buildup Areas
Coordination Required
All
Mission Type
Immediate Smoke
Immediate Suppression
Adjust
Fire for Effect
Assign Final Protective Fires
Assign Priority Target (Copperhead)
Continuous Illumination
Coordinated Illumination
All
Analysis Results
Send Fire Request
Send Order to Fire
Deny
All
Battle Areas
Close
Deep
Rear
All
Target Type
By Category
By Type
All
Attack Option
Mortar
FA Cannon
Rocket/Missile
Army Aviation
Air Force Air
Naval Surface Fire Support
All

Figure 4: AFATDS Intervention Points (IPs) Criteria

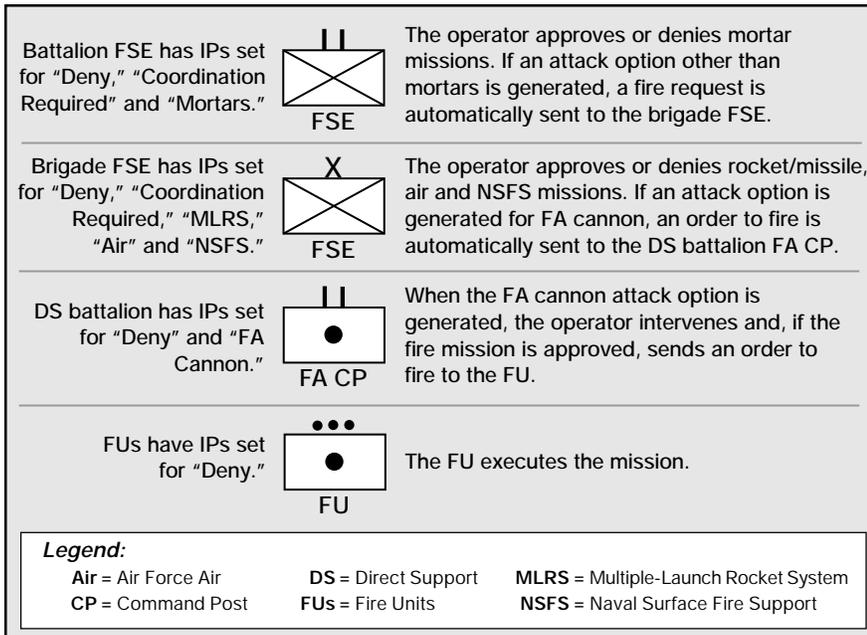


Figure 5: IPs—Management by Exception. The figure shows the IPs after the forward observer sends a call-for-fire to the battalion fire support element (FSE).

Figure 5 shows an example of how IPs could be established within a brigade to facilitate mission processing. Note that the attack systems generally are managed at one fire support node. One exception to this may be FA cannon systems that may require intervention at the brigade FSE (i.e., to approve a mission for a unit without priority of fires) and the FA battalion (i.e., to approve a dual-purpose improved conventional munition, or DPICM, mission when supply availability is low).

Generally, each FSE or FDC should review missions AFATDS recommends for denial; FSEs also should establish IPs for missions requiring clearance of fires. This will prevent losing visibility of missions pending coordination.

Conclusion. The AFATDS guidance settings discussed in this article are certainly not everything a maneuver commander or FSCOORD needs to understand about how AFATDS operates. (See Figure 6.) Trigger events and more sophisticated rule sets to control processing and attacking targets (called fire support system task lists) also can be loaded into AFATDS guidance. The 4th Infantry Division's use of a DAGM is one example of a unit tool to help build guidance in sufficient detail for the operator to enter the data.

Of course, many other variables affect the performance of the total digital fire support system; the effective use of guidance in AFATDS alone will not provide optimum results. For example,

- Digital Annex in the Unit TACSOP
- Mission Prioritization
- Target Management Matrix (TMM)
- Fire Support Buffer Distances
- FA Restrictions
- Attack Methods
- Mission Intervention

Figure 6: "Commander's Criteria" for AFATDS—These are the specific areas in which the maneuver commander should be involved in developing.

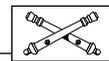
sustainment training and leader and operator tactical and technical proficiency remain basic requirements.

Our understanding and use of ever-changing communications protocols and networks is fundamental to digital op-

erations. Communications capabilities in AFATDS allow units to streamline digital quick-fire channels to support specific, high-tempo operations.

Establishing command and support relationships in AFATDS during setup and initialization also impacts mission processing, automated clearance of fires and data distribution. The entire targeting team—G2, FSE and G3—also has to be on the same "sheet of music" with respect to how specific HVTs/HPTs are mapped to AFATDS target categories and types.

Commanders must understand and influence all these aspects of digital operations. Hopefully this article provides information to allow the commander to focus his efforts and fight more effectively with fires as part of the ever-increasing digitized Army.



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2002 Senior Fire Support Conference

Planning is underway for the next Senior Fire Support Conference at the Field Artillery School, Fort Sill, Oklahoma. The conference dates are 30 September through 4 October 2002. The conference will focus on current, future and joint fires.

Senior Fire Support Conference invitees include Army Corps and Marine expeditionary force (MEF) commanders; Reserve Component (RC) and Active Component (AC) Army and Marine division commanders; Training and Doctrine Command (TRADOC) school commandants;

AC and RC Army corps artillery, FA brigade, division artillery and Marine regimental commanders and their command sergeants major (CSMs); and US Field Artillery Association corporate members

More details on the conference will appear in the next edition of *Field Artillery*. If readers have questions about the conference, contact Colonel Gary Swartz, Director of the Fire Support and Combined Arms Operations Department at swartzl@sill.army.mil or Captain Stacy Gerber, Project Officer, at gerbers@sill.army.mil.