M1A2: One Year Later

Photo: CPT Wade McVey

by Captain John Basso

My objective in this article is to both demonstrate the need to alter how we train the M1A2, and to recommend new ways to train M1A2 units. I've based specific examples of why we need to change how we train the M1A2 on a supposition that I will not address in any detail — that the M1A2 is a *very* different tank than the M1A1. More importantly, I will discuss specific ways to improve how we currently train with the M1A2. As necessary corollaries to this main theme, I'll first detail M1A2 manning and maintenance challenges prior to my discussion of training.

Manning:

M1A2 units face many of the same crew turbulence challenges that their brother M1A1 units face. The requirement for all M1A2 crew members to have the "K4" identifier, though, drastically exacerbates these problems. Soldiers earn the identifier after completing Operator New Equipment Training (OPNET). Such training, typically conducted for the Certification Course (TC^3) at Fort Knox, requires a soldier to be sent TDY. An additional option is a home-station mini-OPNET if a soldier arrives at an M1A2 battalion after that battalion has completed its initial unit level OPNET. This final method's primary shortcoming is that it keeps a soldier away from his unit for two weeks during what is often a critical "get-to-know-the-unit" period. What soldiers cannot do is simply go through "on the job training." The complexity of this schooling issue has grown exponentially as numerous K4-qualified soldiers PCS to Korea, AC/RC, recruiting, and other assignments; there is no stabilization policy. (Of course, in return, we gain inbound soldiers; unfortunately, very few of them are K4-qualified.)

Current solutions to this lack of stability include tying internal battalion and company moves to gunnery train-up periods, and corps and division pinpointing incoming K4-qualified soldiers to assignments in M1A2 battalions.

Likewise, M1A2-qualified mechanics require Mechanic New Equipment Training (OMNET), and similar manning problems naturally occur. M1A2-qualified communications specialists are a separate problem, as there is no program to initially train these soldiers on the VIC-3 intercom or the digital communications infrastructure of the tank.

Recognizing the skills necessary to fight the M1A2 tank only magnifies the complexity of these manning moves. This tank is more like an F-16 than an M1A1 and, just as pilots require consistent flight time to remain current, M1A2 tank crewmen require regular and redundant training on the many systems in the tank. The home station down training, designed to re-familiarize our soldiers with the M1A1, that accompanies our regular rotations to Kuwait and NTC, reduces our opportunities for this redundant training. Quite obviously, it follows, then, that training on M1A1s in Kuwait and NTC — the two sites where our best field training occurs — degrades our ability to learn how to fight the M1A2.

Maintenance:

The M1A2's maintenance system is more reliable, user-friendly, and deployable than the M1A1. The tank's improved reliability is a function of redundant, common Line Replaceable Units (LRUs) [For example, the Hull Electronics Unit (HEU) and the Turret Electronics Unit (TEU) can take over functions from each other in the case of a component failure], computer-driven start-up and shut-down sequences (shut-down requires the driver to override the system if he does not want to wait two minutes prior to shut-down), prominently displayed cautions and warnings, and the excellent fault management system. Improvements in ease of use and deployability are in many ways linked to the elimination of STE-M1 as the primary diagnostic tool. The Built-In Test (BIT) and Fault Isolate Test (FIT) are very user-friendly, as is the gunner's computer-driven self-test. The BIT and FIT, both contained within the tank, eliminate the need for STE-M1, which was both cumbersome and difficult to maintain in its own right.

Maintenance on the M1A2 does challenge the crew and the battalion's and company's maintenance managers in many ways. Of greatest concern is the availability of LRUs, demand-supported

PLL, and what we call the "PPI mentality" or "re-booting the tank" (PPI = Prime Power Interrupt). Lack of available LRUs, a natural outgrowth of the small number of M1A2s fielded, has increased down time on a tank designed to be repaired through replacing LRUs. Initial PLL demand history is generally non-existent for the M1A2. With limited OPTEMPO resulting in an insufficient exercising of the tank, and the strenuous ULLS demand "hits" requirement to carry a part on PLL, we've had a difficult time building a usable PLL in the first year. Units should consider restructuring how they input into the ULLS, in order to base demand on a 58 tank fleet instead of the 14 tanks on which demand is currently based. Units should further examine how they requisition parts (to maximize "hits" on ULLS, input a quantity of one for each widget ordered, and continue to order on separate document numbers until you've ordered the required number of widgets). Taught during OPNET and executed regularly by crews, "re-booting" the tank, or "PPI-ing" it, works around a suspected software or hardware fault and allows the M1A2 to remain in the fight. Because of the M1A2's redundant systems, the tank itself will often find a way around a fault when re-started. Unfortunately, this does not mean that the fault is corrected; it is simply circumvented for short term gain. Eventually, this mentality can lead to extended down-time when the back-up component also breaks. An additional maintenance challenge has followed each M1A2 modification. Invariably, there's a considerable delay between each modification and the subsequent arrival of the publication necessary for maintaining the new equipment. Without the current publication, the crews and mechanics are often "fighting blind" when it comes to diagnosing a new fault.

Overview:

The M1A2 brings a new dimension to the battlefield. The tank has revolutionary improvements in lethality, situational awareness, and maintainability.

The improvement in lethality is primarily a function of the M1A2's faster target acquisition times, due to the tank's "hunter-killer"-capable Commander's Independent Thermal Viewer (CITV). The CITV, controlled by the Commander's Control Handle Assembly (CCHA), allows for independent scanning and a sight picture displayed on the Commander's Integrated Display (CID). The CCHA has a "designate" button which slews the turret from the gunner's current sight picture to the target the commander has identified. The CITV picture is excellent in both narrow and wide field of view.

The M1A2's drastic improvement in situational awareness comes primarily from the Intervehicular Information System (IVIS), which indicates to crew members where they are on the ground, where friendly forces are in relation to them, and where enemy forces have been identified. IVIS provides the commander his current position (through the tank's POSNAV system), along with icons, representing friendly vehicles, on a blank, gridded screen. The IVIS screen on the CID can also display, send, and receive overlays and pre-formatted reports, and will also display an icon representing an enemy contact (with a grid) when the gunner lases a target.

The gunner's and driver's displays can access IVIS information. The Driver's Integrated Display (DID) can also receive up to 99 "way points" from the commander. Combined with a compass — which the driver can change to a "Steer-To" indicator to take him to the commander's way points — the DID and a trained driver can give the tank commander more time to fight his tank, platoon, or company. The TC, gunner, and driver all have improved situational awareness of the tank's operating status through digital cautions and warnings.

The M1A2's maintainability improvements are generated, in part, by an operator- and a unit-level diagnostic system. The crew uses the Built-In Test (BIT) to diagnose faults at crew level. Mechanics use the Fault Isolate Test (FIT) much as the STE-M1 was used. The FIT test, however, is far easier to use than STE, and — since it is a part of the tank — is obviously far less cumbersome than the large, often-broken STE kit with its many pieces.

The gunner also has a Self Test (ST) to run from his GCDP as part of prep-to-fire tests. All three diagnostic tools can be run from the tank commander's, gunner's, or driver's position, and all three are very easy to run.

Training:

Let me begin this section by saying that the M1A2 tank is a "revolutionary" system. Our challenge is how to maximize the incredible potential of this tank. M1A2 company commanders now must think in concrete terms about three issues in particular: a training strategy that addresses a new brand of lethality, drastic on-tank changes in gaining situational awareness, and a maintenance diagnostics system (discussed earlier) that involves the crew and the mechanics. I'll first detail the effectiveness of our current lethality (gunnery) training program, and then depict how we are trying to employ the tank's situational awareness systems. We've never had a tank with true situational awareness capabilities, so I will not focus on our current training program for IVIS, but rather what equipment and procedures are and are not working for us on the tank. (One IVIS training note: to learn IVIS, a unit must work with it every time it trains on the tank. Similar to how we train frequency hopping on the SINCGARS radio, we've found that adding an IVIS element to every event is our best training solution.) As a conclusion to each of these two sections, I'll also postulate on how to improve training or equipment in each area. Because any new strategies must flourish in an environment structured by less OPTEMPO, greater training costs, smaller maneuver areas for a vehicle that has a greater requirement for space, and reduced STRAC, I will also cover Training Aids, Devices, Simulations, and Simulators (TADSS) usage — the Army's primary tool to neutralize these training constraints — in a separate section prior to my final thoughts on future training. The bottom line is that the M1A2 company commander must use greater imagination and innovation to maintain a band of excellence over a wider spectrum of tank capabilities — he has to challenge the M1A2 crew and tank every training day of the year. I've encapsulated most of my major recommendations in a concluding section titled "Thoughts on Future Training."

Lethality. The M1A2 initial training year begins with OPNET and the subsequent OPNET gunnery. The OPNET program introduces the crew to the tank, but definitely does not teach the crew how to fight the tank. You leave OPNET knowledgeable on the M1A2's systems, but you have a lot of room to grow. On the other hand, OPNET gunnery truly challenges the M1A2 crew. The key to M1A2 gunnery train-up is a strategy that implements TADSS early to overcome a significant learning curve between the tank commander and the gunner. Though the Advanced Gunnery Training Simulator (AGTS) is not part of OPNET, we borrowed our fellow battalions' systems, and made extensive use of this excellent simulator "after hours." There was a clear correlation between high gunnery scores and the amount of time crews had spent in AGTS. Table IV was our next focus. We made this "gate" table a more difficult test by requiring TWGSS qualification and firing two additional small arms live-fire engagements. These key moves allowed us to replicate TT VIII conditions (which TT VII does not adequately do) without using precious 120mm bullets. TT VIII itself is an excellent test as its three and four target engagements are presented across the breadth of our largest crew qualification range. The table includes delayed presents which, coupled with the dispersion of the targets, requires the tank crew to use the "hunter-killer" system.

M1A2 gunnery, though, is not without its faults. It is still focused on a "marksmanship" mentality which fails to challenge the entire crew and train all the systems on this tank. TT VIII does not force any kind of TC-driver interface with respect to POSNAV-IVIS and the DID. Gunnery in no way requires the driver to navigate by TC-inputted waypoints while choosing terrain suitable for protecting his tank. Target acquisition — the most difficult piece of the "Red Zone" fight — is not realistically tested by our target arrays and the large plywood presents (I recommend initial presents of vehicle antennas, glint off of enemy binos, etc). As you can see, we are not fully challenging a crew's ability to employ the IVIS.

Battle Command and Situational Awareness. The M1A2 has transformed a unit's ability to maintain situational awareness during maneuver. The POSNAV-IVIS driver/tank commander interface allows our tank commanders, platoon leaders, and company commanders greater freedom to command their unit. By following the TC's way points, a trained driver can effectively maneuver his tank to where the TC wants it, using appropriate terrain. Combined with the VIC-3 programmable intercom system, which allows a tank commander to share "listening" duties for different nets among his crew at different times, the commander is now less apt to be sucked into the immediate fight (fighting his tank only). By properly employing the M1A2's situational awareness capability, then, the commander can plan his unit's next move in the fight in order to determine a course of action that will force the enemy to react to him, instead of vice-versa. IVIS should allow the commander to complete this process of battle command by easing his ability to rapidly relay his thoughts via digital traffic. The IVIS 286-like processor, however, is far too slow to allow a commander to send his instructions, even if the IVIS system were user-friendly enough to let him rapidly compile his FRAGO. Instead, the M1A2 unit in contact remains an FM communications-controlled beast. **IVIS is a 286-like system in a Pentium-like tank.**

An additional element of the IVIS's ability to communicate information is its capability to provide greater fidelity in spot reports and calls for fire. Currently we cannot train this process because it requires the tank's laser to be active. With no eye-safe laser rangefinder, our ability to fully employ the system during force-on-force maneuver training is crippled. The task force's ability to command and control its M1A2 companies is reduced to the battalion commander's and battalion S3's tank, as we have no IVIS Ground Station (IGS) at battalion level. This keeps TF command and control nodes from being able to participate in M1A2 FCX-type events. As mentioned earlier, the IVIS is cumbersome to use. Constant practice is an absolute requirement to stay current on this system. A "Windows-based," simplified program would drastically reduce the learning curve and make IVIS far more effective in "pressure" situations.

Prior to this change, we can increase our day-to-day ability to train on the M1A2's battle command and situational awareness systems by incorporating the Crew Station Trainers (CSTs) into our company training plans. We currently use the CSTs only during OPNET. Five CSTs fielded to each M1A2 battalion would allow excellent platoon-level IVIS training. Company and TF leadership "IVIS-EXs" could also be run on five CSTs. The cost, speed, and cross-training value justify this need.

Finally, the TC could more easily overcome this "challenge" of managing information if he could transition with less difficulty from the "up" position in his hatch to the "down" position. Currently, it is a struggle to reorient the CITV display on the CID to a target he may have acquired with binos, as the thermal picture give a different perspective. That issue is magnified by the inability of a thermal sight to pick up vehicle signatures — like antennas or glint. The CITV needs a daylight channel to maximize its effectiveness.

TADSS Usage. TADSS are clearly an important part of the M1A2 training cycle. TADSS not only allow us to save on costs as we train up in garrison in order to train effectively in the field ("Train to Train"), but also allow us to make our field training both more realistic and less expensive as we save bullets. Unfortunately, in an era when we never seem to have enough time, each TADSS system requires a necessary significant investment in soldier hours to certify leaders on the proper use of these new tools (as MILES required when it first came out). I'll address our two gunnery training systems first, beginning with AGTS, which plays as important a role as UCOFT previously did.

The AGTS is an absolutely critical part of our gunnery train-up. Its excellent graphics and realistic controls maximize tank commander-gunner teamwork and training. The AGTS does not, however, fully integrate IVIS, nor does it allow the driver or loader to be involved in the training.

TWGSS, our other primary TADSS gunnery training device, does fully integrate the entire crew. It provides tank crews immediate feedback on their gunnery performance. Its ability not only to project a round's flight and impact after a trigger pull, but also play audio replication of a tank firing a round over the crew's intercom system allows for live-fire realism. More importantly, the system's laptop AAR configuration allows the Tank Crew Evaluator to conclusively demonstrate faults in engagements and show trends throughout a run. Unfortunately, TWGSS does not come with a "splash" replicator for the CID, nor does it adequately replicate machine gun engagements. TWGSS and AGTS are our primary gunnery train-up TADSS devices.

Precision Range Integrated Maneuver Exercise (PRIME), though we have not employed it to do so, can be used to train gunnery skills. We've used it for our maneuver training because it allows a battalion commander to produce excellent "NTC-like" AARs for his companies and platoons through its satellite tracking and "RGB" map playback capabilities. The PRIME system is tailor made for an M1A2 maneuver exercise as it allows the unit to judge how well it maintained situational awareness while dispersing to make full use of the M1A2's ability to effectively increase battlespace.

Similar to SIMNET, but with far greater fidelity and realism, the Close Combat Tactical Trainer is a full simulation that can train M1A2 maneuver. It superbly matches the functions of each crew station in the tank, while allowing for realistic integration of the M1A2's increased lethality and situational awareness. Its realism, coupled with CCTT's "unlimited maneuver area," allow this device to successfully act as a potential surrogate for some of the maneuver training eliminated by current constraints.

As OPNET's primary training aid, the Crew Station Trainers (CST) are remarkably effective trainers of the digital interface between the driver, the gunner, and the tank commander. This high-speed, linked computer can replicate the DID, the GCDP, and the CID. The quality of the replications, the speed of the computers — which are much faster than the IVIS's processor on the actual tank — and the ability to link the CSTs together to train a platoon, a company, or a task force make this device invaluable in training our units to learn how to maximize the capabilities of the tank.

Thoughts on Future Training:

This tank is an absolute **superstar**. Here is "a way" to re-orient our training programs to allow M1A2 units to train to the full potential of the tank.

Crew level gunnery needs to remain as is, in terms of training an M1A2 crew to put steel on target. IVIS and POSNAV, however, need to be incorporated in order to fully test every member of the crew. The tank commander should be given operational graphics from which he would be required to create an IVIS overlay with waypoints at each "support by fire" checkpoint (these grids could even be purposely incorrect to test the TC and driver's understanding of an "intent" graphic). We should eliminate course roads as we know them. To ensure safe training, each SBF checkpoint would be a safetied fighting position, as would each "maneuver box." Drivers would then have to move the tank based on the "Steer-to" indicator and their knowledge of terrain. TT VIII should include an initial call for fire engagement that requires a digital call for fire report to be sent up, based on a lased enemy target. Finally, force the crew to fight the "Red Zone" fight by changing FM 17-12-1-A2 standards. The standards should penalize crews that remain up on the berm for too long (currently a crew could stay up for 45 seconds in a defensive engagement). FM 17-12-1-A2's gunnery conditions should also incorporate realistic target acquisition problems into the scenarios (get rid of the huge plywood barns that "appear" in the middle of the range).

Section-level gunnery should be considered as a live-fire surrogate to TT XII. Our home station ranges cannot support the incredible amount of battlespace that an M1A2 platoon is capable of fighting on (only at the NTC). These current TT XII ranges are really only capable of challenging an M1A2 section. Incorporating a TT X does have additional training benefits. For example, an M1A2 section-level battle run will more realistically test fire coordination and maneuver using the wingman concept, still a requirement for lethal platoons, than did TT XII. In order to incorporate command and control training — a critical element of TT XII — into section gunnery, the platoon leader could maneuver as a non-firing third tank and IVIS situational awareness training, as described in crew gunnery, could be extended to the section and platoon level. Our range constraints, as well as our budget and live-fire ammunition constraints, necessitate this shift from a live-fire TT XII to a live-fire TT X.

Units, though, cannot discard platoon-level gunnery. Two separate TADSS-based training events, and one live-fire M1A2 training event, could take the place of the current platoon battle run. Current TADSS options, including PRIME, TSV, and TWGSS, all allow for construction of a realistic "maneuver-TADSS TT XII." An example of this battlespace-realistic platoon battle run would take place with triggered target lifters, to the front and flanks of the platoon, on Fort Hood's Training Area 35, Antelope Corridor. The ability of the battalion commander to train platoons on fire distribution and situational awareness would only be limited by his imagination. The second TADSS option would be CCTT if land were not available. (If land was available, CCTT would serve as a solid TT XI.) The only live-fire option that would fully challenge the M1A2 platoon would be at the NTC. I recommend studying the feasibility of extending the rotation by a week to allow units to begin a rotation with a live-fire "Drinkwater" TT XII.

For the M1A2 to reach its "this generation" potential as the primary maneuver system of the U.S. Army, it needs a few minor modifications. First, we need to improve each unit's ability to acquire targets and hand them over. Let's begin these improvements by giving our TF scouts an IVIS Ground Station (IGS)-linked, hand-held laser rangefinder capable of sending a spot report to an M1A2. The M1A2 tank commander then should be able to "double click" his mouse on the spot report enemy icon and have the grid go into a "designate cue." With the M1A2's internal POSNAV system providing its own grid, the tank — after the TC activates the cued icon — should automatically designate either the gun tube or the CITV onto that suspected enemy position. The tank should have the capability to execute the same function, based on a fellow M1A2 wingman's spot report. These improvements would reduce the difficulty of target handover — one of our biggest "Red Zone" problems. The recommendations outlined in this article are only "a way" to improve M1A2 training. What hopefully is clear, though, is that the M1A2 is a very different tank than the M1A1. We need a different training model to allow our units to reach their potential on this fantastic tank.

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