Strategy Research Project

Addressing the Growing Training Burden

by

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The equipment that the U.S. Army is fielding is growing more complex, requiring more hours of training for Soldiers to master. These skills decay over time and require frequent refresher training. The amount of equipment per Soldier and per unit is also increasing. Together, these three trends place an increasing training burden on units. This burden may force to reduce time spent on collective training to make room for the increasing equipment-specific tasks, or take shortcuts with equipment training. New equipment may not increase unit effectiveness as much as planned and in some instances may even reduce it. This problem is particularly important as resources fall and Army force structure falls. Current strategy calls for Army units to be proficient on a wider array of tasks than they have in the past, decisive action, stability operations, and building partner capacity. The length of time required for a unit to become proficient is a critical part of how many ready units the Army can deploy to a contingency. The Army should develop a training time budget for various unit types to help make tradeoffs when considering new equipment development and enforce trainability standards on new equipment acquisitions.

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Addressing the Growing Training Burden

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Abstract

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The equipment that the U.S. Army is fielding is growing more complex, requiring more hours of training for Soldiers to master. These skills decay over time and require frequent refresher training. The amount of equipment per Soldier and per unit is also increasing. Together, these three trends place an increasing training burden on units. This burden may force to reduce time spent on collective training to make room for the increasing equipment-specific tasks, or take shortcuts with equipment training. New equipment may not increase unit effectiveness as much as planned and in some instances may even reduce it. This problem is particularly important as resources fall and Army force structure falls. Current strategy calls for Army units to be proficient on a wider array of tasks than they have in the past, decisive action, stability operations, and building partner capacity. The length of time required for a unit to become proficient is a critical part of how many ready units the Army can deploy to a contingency. The Army should develop a training time budget for various unit types to help make tradeoffs when considering new equipment development and enforce trainability standards on new equipment acquisitions.

Addressing the Growing Training Burden

The U.S. Army infantryman of 1944 went into battle wearing a steel pot, simple web gear, and boots. He carried an M1 rifle and enough ammunition, water, and food to sustain him. His equipment in current dollars would cost about $3,300.[1] Today's infantry Soldiers go into battle with a full suite of body armor, knee and elbow pads, and protective eyewear. Their weapon is an M4 Carbine equipped with a rail system that can mount a number of devices such as the Close Combat Optic, the AN-PEQ 16B Infrared Light, as well as a Light Weight Thermal Weapons Sight. The Advanced Combat Helmet allows them to mount AN/PVS-14 Night Vision Goggles. They are also equipped with the new Rifleman's Radio, which allows them to share voice and data communications with the rest of the squad. The estimated cost per Soldier of this equipment is about $14,700, almost five times as much as the World War II predecessor.[2]

The missions that the Army asked the infantryman to master in 1944 have not gone away; attack, defend, raid, night attack, infiltration, and reconnaissance.[3] In addition to these missions, the Army has now added the requirement to master the skills associated with using a collection of increasingly complex equipment. The additional equipment for the M4 carbine alone (optics, night sights and laser target pointer) may require as much as ten additional days of training per year beyond the time required to master the basic rifle with iron sights.[4] This only scratches the surface of the additional training time needed since the modern rifleman also carries communications gear, a Global Position System navigation device, and personal night vision goggles. When coupled with proper training, the devices make Soldiers more effective, but only if they dedicate time to mastering them that earlier Soldiers spent training on collective tasks.

This is true for all Soldiers, not just the infantry. Across the U.S. Army over the last two decades, the equipment fielded has grown in complexity, and strains the ability of units to train to standard. The U.S. Army Training and Doctrine Command (TRADOC) recognized this problem in its recent *Trainability White Paper* noting, “The growing complexity of systems and related demand on the Soldier is a major impact on training in the institution and in units.”[5]

Technology growth has spawned three interrelated trends that threaten to reduce unit performance and agility. First, the equipment the Army is fielding today is more complicated than the equipment it replaced, which in turn increases the training burden placed on units and the institutional Army. Second, the skills acquired in training decay over time, which adds the requirement for periodic refresher training. Finally, equipment density (defined as the quantity of equipment per Soldier) is also growing, amplifying the impact of the first two trends. A reasonable outcome from these three trends is to either crowd out collective training to the detriment of unit effectiveness, or force commanders across the Army to take shortcuts on individual and crew training on equipment. Such shortcuts may lead to users who are unable to access the full capability of their systems. Additionally, ill-trained operators may damage equipment or even injure other Soldiers or themselves due to improper use. Air defense fratricides during Operation Iraqi Freedom are examples of this risk. Two of the eleven Patriot engagements in the opening stages of the invasion of Iraq in 2003 were fratricides attributable to operators whose training was inadequate to use a system that had grown more complex since its inception.[6]

The implications of a steadily growing training burden are significant. In 2002, an Army War College study of training requirements found that the time needed by companies to execute all of the training mandated by higher echelon headquarters totaled 297 days (out of 256 days available to train per year).[7] The Army's *Strategic Planning Guidance* lays out a strategy for the years ahead that includes retaining hard-won skills associated with fighting a counter-insurgency while simultaneously sharpening competencies needed for the full range of combatant commander requirements.[8] This approach demands that units train on a longer list of collective tasks, making training time even more precious than it has been in the recent past. The growing training demands imposed by increasing equipment quantities and complexity threaten to displace other training and potentially reduce unit effectiveness. Furthermore, the Army may be making poor investment decisions by evaluating the performance of systems in tests where the users had more training in preparation for the test than they can realistically expect to receive in operational units. An examination of these trends and their impacts on the Army leads to some compelling recommendations regarding lines of effort to mitigate the increased training burden.

Implications

Increasing equipment density, coupled with system complexity and the problem of skill decay are contributing to an uncontrolled growth in the training burden that individual units and the institutional Army face. These trends have important strategic implications. First, these growing demands threaten to decrease the time available for collective training. This effect is enormously important for the U.S. Army at a time when the nation is asking it to be ready to execute a broader array of tasks than it traditionally has in the past. As the Army's counterinsurgency efforts in the Middle East reached their peak in 2007, an important debate heated up between advocates of counterinsurgency and those who believed the Army needed to focus on training for high intensity conventional warfare.[9] The schools of thought debated two issues:

1) The likelihood of state-on-state aggression in the future, and;

2) Whether conducting counterinsurgency in failed states is critical to protecting national interests.

The underlying source of energy in this debate is recognition by the majority of observers that the Army cannot optimize for both. Optimized or not, the *Army Strategic Planning Guidance for 2013* demands a flexible force:

> This environment requires a force that can perform across the range of military operations with myriad partners, simultaneously helping friends and allies while deterring foes. At the same time, that force must be capable of undertaking independent action to defeat enemies, deter aggression, shape the environment and provide support to civil authorities.[10]

The 2014 *Quadrennial Defense Review* reaffirms the requirement for the Army to retain the ability to perform across the spectrum of conflict, even though it will no longer be large enough to conduct “large-scale prolonged stability operations.”[11] In addition, the Army’s leadership is interested in building cultural awareness and language skills in their Soldiers to better prepare them to operate in the human domain. Such a broad range of potential missions puts a premium on training time. The Army must avoid acquiring technology that reduces the time available for training--unless making a conscious decision that the added capability is worth the tradeoff in displaced training. In fact, the Army should make a concerted effort to acquire technology that is easier to use in a deliberate effort to increase training time available to commanders.

In order to avoid increasing the training burden on its units, the Army must also consider the training requirements of the technological equipment it is acquiring. In the

Department of Defense, all major defense acquisitions must go through an Initial Operational Test and Evaluation which determines “whether systems are operationally effective and suitable, and which supports the decision to proceed Beyond Low Rate Initial Production (BLRIP).”[12]

During operational testing, the Army provides the new equipment to Soldiers in an operational unit to use in a realistic environment. Operational test planners today have no awareness of the training time “budget” under which operational units function. When designing an operational test, the test planners allocate time to train the test units with the new equipment. The testers determine this allocation based on how much time the materiel developer needs to conduct adequate training. The planners do not consider whether that time might be unrealistic for a typical future unit with other competing demands. This may lead the test community to allocate an improper amount of time to training a test player unit, resulting in invalid system test results and contributing to a poor investment decision.

Such results could come about in one of two ways. In the first scenario, inadequate time is available for the training unit to prepare for the test due to more pressing requirements resulting in poor performance rife with operator errors. In this situation, evaluators have difficulty determining the real capabilities and limitations of the equipment. In the second scenario, the training unit receives time considered adequate by the materiel developer to prepare for the test. The unit with the new gear would likely perform well, at a performance level that may positively influence an acquisition decision. It is quite possible that an actual operational unit with real world time demands will not have adequate time available to train on this equipment and, as a result, the true realized performance of the equipment in the field is something less.

In 1993, the Institute for Defense Analysis published a study that concluded: “If there will not be adequate unit training to achieve and maintain peak unit combat skills (i.e., the design levels of performance) with new equipment, then the performance of the equipment should be discounted by a factor of 2 in assessing a new system's cost-effectiveness.”[13] This challenge led Congressman Ike Skelton to comment, “It seemed that whenever a new system was put into the hands of the Soldier, actual field performance often failed to match the standards predicted during its development.”[14]

The Army’s process for allocating time for pre-test training, combined with the lack of a process for budgeting overall available training time, increases the likelihood that the Service will acquire equipment that underperforms in the field due to inadequate training. When the Army presents units with training requirements that exceed the time available, commanders have to make choices. Sometimes, they will choose to reduce the time dedicated to training individuals and crews to use certain pieces of equipment. When this happens, the equipment often does not live up to its tested performance. In essence, the Army’s failure to actively manage training burden may reduce the effectiveness of expensive weapon systems and more dangerously, reduce the overall combat effectiveness of units.

Today’s Equipment is More Demanding

One metric for measuring the training burden imposed by equipment is the number of hours of training per Soldier required for New Equipment Training (NET). According to *Army Regulation 350-1*, “NET will assist commanders achieve operational capability in the shortest time practical by training Soldiers and crews on how to operate and maintain the new or improved equipment."[15] Each NET effort is a finite project, lasting only as long as required to field the systems across the Army. It is therefore difficult to find data on past NET efforts. The U.S. Army Materiel Command maintains the Army Modernization Training Automation System (AMTAS), a database where training managers for materiel fielding teams or the institutional training base can enter information on NET.[16] However, many systems have no records in AMTAS and other records are incomplete, making a complete comparison of NET requirements past and present impossible. Nevertheless, there is enough data from the database and from queries of individual experts to assemble a sample survey to provide a view of what the larger trend may look like. The systems in Table 1 show successive iterations of like capabilities:

Table 1. Comparison of New Equipment Training Lengths (in hours per Soldier)[17]

Role	**1991**	**1999**	**2013**
Platoon Radio	PRC-77	PRC-119	PRC-155
	4	8	16
Main Battle Tank	M1A1	M1A2	M1A2SEPv2
	320	320	320
Chemical Alarm	M8	M22	JCAD
	3	3	3
Infantry Fighting Vehicle	M2A0	M2A2 (ODS)	M2A3
	216	296	376
Mortar Systems	NA	M31	M95
	NA	40	80
Artillery C2 System	BCS	AFATDS Inc 1	AFATDS Inc 2
	40	160	80

The average change in NET length over the baseline was 62%, but this number masks the significant variability that exists in the data. The difference between 0%

growth over time (chemical agent alarms) and 400% growth (platoon radios) is staggering. More importantly, the absence of any requirements stipulating how difficult a system can be to learn may indicate that the Army acquired these systems without knowing the impact on training.

One important exception to the general trend was Advanced Field Artillery Tactical Data System (AFATDS) Increment 2. Although still an increase in length over the baseline system (Battery Computer System also known as BCS), AFATDS Increment 2 is on track to cut in half the training burden of its immediate predecessor. This outcome is the direct result of a deliberate effort by the Fires Center at Fort Sill, Oklahoma to simplify the system, as specified in the Capability Development Document (CDD). Of the 17 requirements documents reviewed for this paper, the AFATDS CDD was the only one that included an enforceable requirement aimed at reducing the training burden.[18]

NET duration is at best an imperfect proxy for how difficult it is to master a given system. In some cases, NET durations shrink over time. The PRC-119 NET referenced in Table 1 originally required forty hours when the system was first fielded.[19] This could be the result of trainers becoming more efficient with practice in their delivery. Alternately, the Army's desire to minimize the burden on operational units that must support tests could result in external pressure to trim training time. The latter effect is more likely as a system matures, since a level of familiarity with the equipment builds across the Service and makes leaders more comfortable with a NET that covered only the more important of the total tasks. John Hawley, an expert in Manpower and

Personnel Integration at Fort Bliss, Texas suggested that trainers usually do not design NET against a measureable standard:

> NET is not performance oriented or criterion-referenced. At best, it's loose familiarization training (and highly variable in terms of coverage). If NET were role-related, performance-oriented, and criterion-referenced, its length might be driven by the number and complexity of the performance objectives involved. That's not the case with most (if not all) NET . . ."[20]

Although clearly imperfect for measuring system complexity, NET duration is still the best proxy available for attempting to gauge the training burden on units. However, an additional measure would be useful to help evaluate if the apparent growth is in fact a real trend.

One possible alternative measure is the length of operator technical manuals. Since the operator's manual contains all of the operating procedures as well as operator maintenance tasks, the volume of content is a rough, but reasonable, gauge of how much information the user should be familiar with. Table 2 contains a sample of several families of equipment, showing how the length of operator manuals changed as equipment evolved. The page growth percentages were determined by comparing the boxes shaded in gray. The NET growth numbers come from the NET times associated with the same shaded boxes in order to make a direct comparison possible. Although there are some outliers, there appears to be some correlation between page growth and NET length. More importantly, the data on operator's manuals supports the assertion that our equipment is growing more complicated and the demand for time to train Soldiers is increasing.

Table 2. Comparison of Operators Manual Page Counts[21]

Role	Old	Mid	Today	Page Growth	NET Growth
Platoon Radio	PRC-77	PRC-119	PRC-155		
	44	150	NA	341%	400%
Main Battle Tank	M1A1	M1A2	M1A2SEPv2		
	2760	NA	4196	152%	0%
Chemical Alarm	M8	M21	JCAD		
	177	77	244	138%	0%
Infantry Fighting Vehicle	M2A0	M2A2 (ODS)	M2A3		
	1592	2072	2188	137%	174%
Mortar Systems		M23	M95		
		288	592	206%	200%
Artillery C2 System	BCS	AFATDS Inc 1	AFATDS Inc 2		
	204	1616	NA	792%	400%

The Recurring Cost of Skill Decay

The Distributed Common Ground System--Army (DCGS-A) is an intelligence information system that integrates data from a wide variety of sources and is a recent example of a system under fire for complexity. A November 2013 Army memo indicated that the initial training program that included two 80-hour blocks of instruction was generally insufficient for Soldiers preparing to deploy to Afghanistan.[22] Of equal concern, the skills developed in training can perish quickly. In the same 2013 memo, the unit noted that “using DCGS-A was not like riding a bike, if conditions are not set for an analyst to use DCGS-A daily or almost daily, then the expectation for proficiency will drop greatly.”[23] NET represents an upfront investment in Soldier and unit performance. Realistically, this investment is only a down payment. Because of skill decay, each system requires sustainment training at regular intervals to maintain proficiency at the individual and crew level. Studies by the Army Research Institute (ARI) and others have shown that different skills decay at different rates, depending on a number of factors.[24] Figure 1 shows different theoretical decay curves to illustrate the concept.

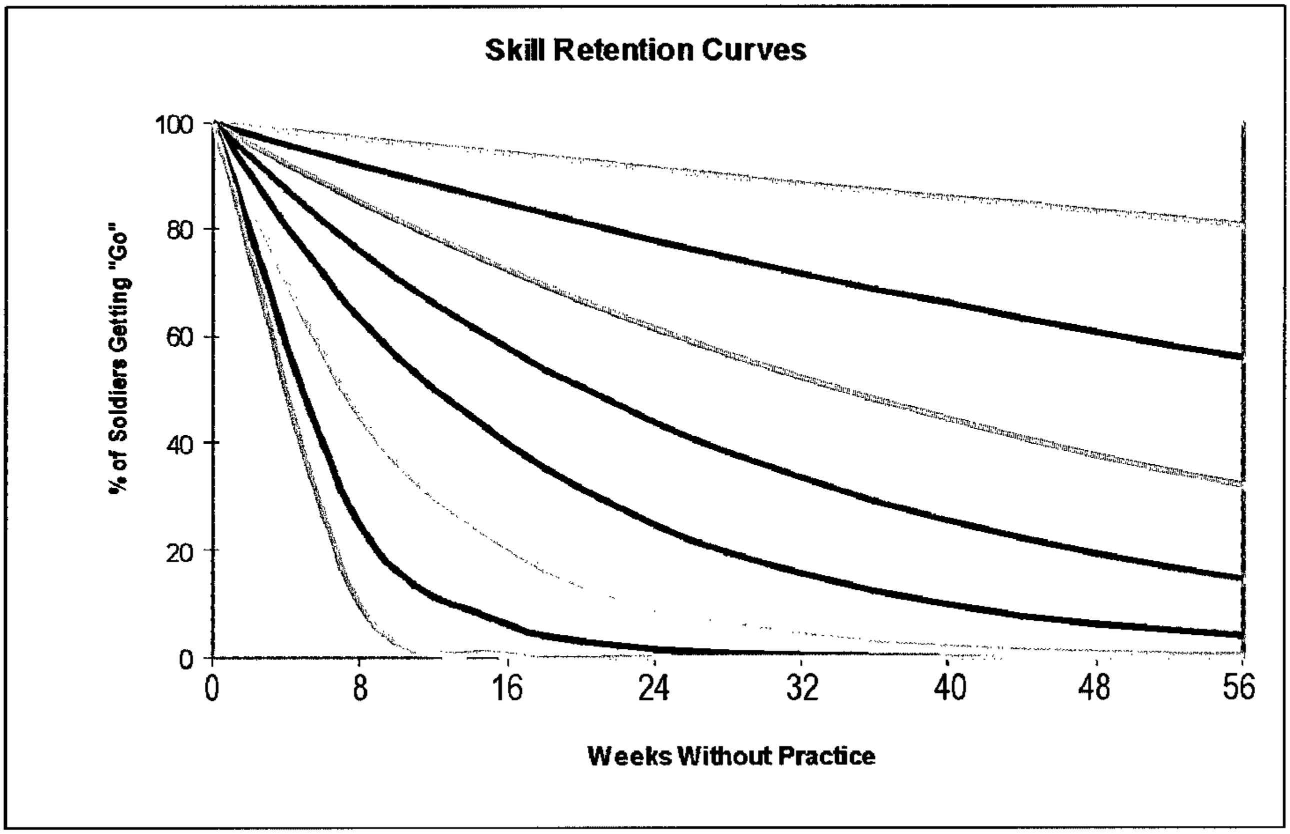

Figure 1. Theoretical Skill Retention Curves[25]

Many factors influence the rate of skill decay illustrated by the significant differences between the various curves in Figure 1 above. The curve furthest to the left is appropriate for a system with tasks that are most susceptible to skill decay. In this instance, a group of personnel trained to proficiency would almost all fail a skills test within eight weeks if they did not practice. By contrast, the curve furthest to the right would be appropriate for a system whose tasks are most resistant to skill decay, with more than 80% of personnel still able to pass a proficiency test after a year without practice. In 2006, ARI reviewed seventy-two studies and articles on skill retention in an effort to understand those factors. The study concluded that there are three categories of influences; “Procedural variables (e.g., number of training trials, retention interval, and training approaches), task variables (e.g., task complexity or the number of steps in a task), and individual variables (e.g., intelligence and background knowledge).”[26] Each of these three areas provides other prospects for the Army to reduce skill decay. Units can use procedural variables to develop a more efficient training regimen. Materiel developers could use a better understanding of how task variables affect skill decay to design systems that maximize retention for the learning those systems demand. Finally, armed with knowledge of how individual variables affect skill decay, the Army could modify selection standards for certain military occupational specialties or for system operators within a given branch.

Although these efforts can be an effective means to manage skill decay, they cannot eliminate it. Ultimately, Soldiers must regularly use the skills acquired in their initial training on a system or they will decay and require retraining. Since any given unit has a full training calendar year after year, increasing the number of hours dedicated to retaining proficiency will likely have to push something else off the training calendar. Therefore, skill retention joins equipment complexity as a factor contributing to the increasing training burden imposed on units and the Army as an institution.

Equipment Density is Growing

The sheer growth in the quantity of equipment the Army now fields to its formations multiplies the training demands imposed by skill decay. Table 3 illustrates the changes in equipment density in a tank company between 1989 and 2014. A Typical

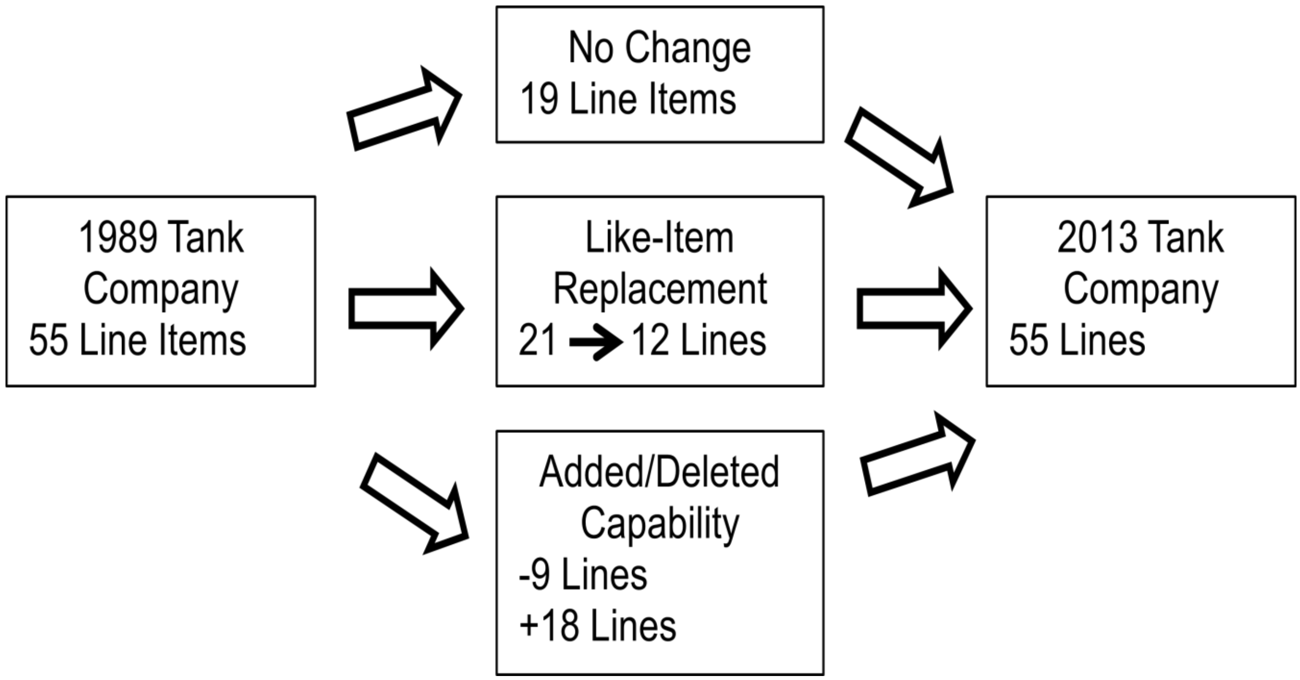

Figure 2. Tank Company Equipment Density Changes, 1989-2014[27]

tank company Table of Organization and Equipment (MTOE) from 1989 lists 55 distinct types of equipment, also known as "line items." Surprisingly, the tank company of 2014 also includes 55 line items. However, there was significant change within those 55 lines. As Figure 2 shows, only 19 of them remained unchanged. Two examples of unchanged line items include binoculars and bayonets. Another category of change was the "like item" replacements, which includes things like the VRC-12 series radio of 1989 which was replaced by the VRC-92F SINCGARS radio of 2014. The number of line items on hand actually increased but remains the same because of a change in Army accounting rules that no longer require certain items to be listed by units on the MTOE, such as camouflage nets and radio installation kits.

The bottom box of Figure 2 reflects the problem of equipment density, where a net increase of nine line items reflects new capabilities (and new training requirements) that did not exist before. Table 3 shows that the net increase in training burden may be substantial.

Table 3. Tank Company Added/Deleted Capability Comparison

Change	Number of Lines	Estimated Change in Training Hours Required
Deletions	-9	-14
Additions	+18	+293.5
Net Change	+9	+279.5

Six of the nine lines of equipment reflected in Table 3 as deleted were associated with the cables, reels, and telephones that the Army used to use to communicate between positions when stationary for longer periods. Two more were the devices used to encrypt radio messages, a function now built into the radio itself. The ninth and final deletion was a pump designed to allow the tank company to pump fuel from captured sources. The additions to the modern tank company's equipment list are completely new capabilities, such as handheld mine detectors or the Future Battle Command Brigade and Below system that provides the position of friendly forces in real time and allows units to pass graphics, text, and reports digitally.

The total hours of training for those items listed as added totaled 293.5 hours. This number is not a perfect measure of the recurring training burden on the unit because once Soldiers are trained the first time, the regular refresher training time needed to reduce skill decay should be a smaller number. Some of those hours are limited to a small subset of personnel in company--such as the supply sergeant or the operator of the lone high frequency radio. However, the key points remain; all new equipment comes with a training burden unless it displaces something that was harder to train. Additionally, the Army often makes decisions about acquiring new capabilities without enough consideration for the training budget of the gaining units and how it may influence overall unit effectiveness.

Recommendations

Clearly, uncontrolled growth in equipment training requirements is a problem. Units that need more time for collective training to prepare for a broader mission set can afford neither to give up extra time for Soldiers to maintain proficiency of their equipment nor to have Soldiers that are not able make full use the capabilities that their equipment is supposed to provide. There are two interrelated steps that the Army can take to reverse the growth trend and return time to commanders. Requirements documents need to address training burden. The Army should develop a training time budget to help inform logical decisions about the tradeoffs between system capability, training burden, and the cost of additional engineering efforts that might help to address the problem.

In order to mitigate the increased complexity of the Army's equipment, the best place to start is at the source--the equipment itself. The commercial sector, especially in the information technology fields, has a great deal of experience and skill when it comes to simplifying the experience for the user. A modern iPhone does not come with a user manual or require a series of training sessions, yet it is a remarkable piece of equipment capable of performing many functions. The innovative engineering that makes the iPhone so simple was not easy--it was a challenging and expensive endeavor and Apple only undertook it because of the necessity to compete in the marketplace. Similarly, the defense industry will not put serious effort into simplifying the user experience unless there is a firm requirement in their contract. In turn, defense project managers will only expend funds to obtain capabilities that are demanded in a requirements document.

Unfortunately, most current requirements documents demand little from industry in terms of cutting training requirements. A survey of 17 selected documents currently active in the Army's Joint Capability Integration Development System (JCIDS) database revealed that nine systems have no specific requirement for training time or simplicity.[28] Of the eight systems that did, all but one had vague phrases like "minimize the amount of initial and sustainment training required"[29] or "The instruction and resources required . . . shall not significantly increase."[30] These phrases are not objective and are open to interpretation, resulting in little incentive to deliver a measurable improvement. Of note, the requirements for Increment 2 of the AFATDS were clearer: "At the individual/OPFAC level, AFATDS must be designed to decrease the amount of initial and sustainment training required to acquire and maintain proficiency in the use of AFATDS Increment 2 applications."[31] Although there are no metrics in this requirement, one may infer that the new system will be easier to train than the one it replaced and will provide a metric for test and evaluation. This approach may soon bear fruit. Although AFATDS Increment 2 has not yet completed testing, initial indications are that the NET course will be 80 hours, compared to 120 hours for the legacy Increment 1 system.[32]

The current JCIDS regulation requires Services to include (or justify the absence of) a training Key Performance Parameter (KPP).[33] The TRADOC *Trainability White Paper* recommends expanding the training KPP to include trainability criteria.[34] The Army must use care if it takes this approach. In order to accomplish this, requirements writers must estimate how long it will take to learn a new system before system design begins. It is unlikely that the writers will get it exactly right. More likely, they risk setting an unrealistically difficult goal, or one that is too easy to meet and fails to incentivize designers to improve trainability. There is a possibility that requirements writers will select a poor trainability goal that proves to be either unachievable or unaffordable.

For the upgrade of an existing, mature system like AFATDS, enough data exists for reasonable estimates of what an achievable trainability goal might be as well as an estimate of how much engineering effort would be required. For a new system that has yet to begin design work, constructing such estimates is much more difficult and they are more likely to be significantly wrong. A requirement that is too challenging may cause significant cost increases. A requirement that is not challenging enough may fail to achieve the goal of leveraging the innovation of private industry to drive down training burden.

In spite of this difficulty, a trainability requirement for a new start program has the potential to yield more dramatic improvements than for a mature system limited by an existing architecture. Imagine a promising weapon system in its final stages of testing that has provided a significant improvement over existing capabilities, but consistently fails to meet the trainability requirement established by the Army prior to Milestone B. If the Army determined that the increased capability was worth the added training burden of the system, it could seek a waiver from the Joint Requirements Oversight Council and proceed with the acquisition.

If the Army tested a new weapon system and it failed to meet the trainability requirement, senior leaders would have to make a decision. The choices would likely be to invest more time and money in hopes of improving trainability, or determine that the added capability was worth the increase in training burden and accept the system as is. If the latter, how would the Army determine if the added capability was in fact worth the added requirement for training time? Since the amount of training time in a year is fixed, what other training would the Service be trading away to make room? At present, there is no process in place to allow for such an evaluation. One possible model for managing training burden comes from the way the Army manages maintenance burdens associated with new systems.

During the development of new systems, regulations require the materiel developer to address supportability.[35] Part of supportability is determining the maintenance burden imposed by the system. *Department of the Army Pamphlet 700-56* details procedures for calculating the maintenance man-hours for a system based on projected failure rates and the times required for each maintainer task demonstrated during test.[36] This system provides two important advantages. First, decision-makers who must evaluate whether the added capability is worth the cost of adding maintenance labor to the force structure consider the burden that a system might place on the units that receive it early in the process. Second, the acceptable maintenance burden determined up front sets limits on the materiel developer who has to manage system reliability and maintainability, which are the primary drivers of maintenance man-hours.

The Army should develop a budget for unit training time to assist decision-makers in evaluating the training burden of new systems and the associated trade-offs. U.S. Army Forces Command maintains some high level training timelines for major units such as corps, divisions, and brigade combat teams.[37] Force planners use these timelines to support budgeting for training events in terms of vehicle miles, ammunition consumption, and major training exercises such as combat training center rotations.

Force planners also use training timelines to help determine how long it should take units to reach a training level that allows them to be deployed and, in turn, identify how many units would be ready to deploy in a given time window, based on force structure and funding levels. With some additional refinement, it would not be difficult to develop a rough division of training hours available in a training cycle.

The Army could allocate portions of those hours to individual training, as well as collective and multi-echelon training. For an incremental improvement to an existing system, the Army should assign a goal that is equal to or less than the training time required for its predecessor. In cases like these, the training budget would normally be used later in development (Milestone B and C) to evaluate impacts when the actual product fell short of the goal and senior leaders need to decide whether or not to accept the additional burdens or fund efforts to further improve system trainability or possibly its training delivery.[38] When considering systems that are additive (meaning not replacing an existing system but representing a completely new capability), decision-makers would consider the training issue much earlier (at Milestone A or even at the Materiel Development Decision) and could use the training time budget to consider whether the added capability was worth the estimated additional training burden.

The training budget concept could help to improve the efficiency and effectiveness of NET. In the *Journal of the International Test and Evaluation*, Dr. John Hawley outlines several common shortcomings in the training given to units prior to executing tests of new equipment. Although the article focused on training prior to test, the shortcomings are applicable to NET in general. Four of the seven listed shortcomings stand out:

1) lack of formal training requirements analysis,

2) improper training delivery methods,

3) training shoehorned into a fixed schedule rather than given the importance and time it requires, and

4) lack of a unit focus for training when such a focus is required by test objectives[39]

A thorough analysis of training time budgets for units receiving a given system would provide excellent input to requirements writers to consider. If the requirements document specified how much training time was acceptable for the system, evaluation of the training would become a significant objective of the test. This incentivizes the materiel developer to balance efficiency and effectiveness in training to ensure success of the program. Similarly, such a requirement in the contract would incentivize the contractors responsible for designing and building the system to make it easier to understand and to ensure the efficacy of the training package.

Another example of how the combination of the training budget concept and trainability requirements could improve is in the area of commonality. By making user interfaces more common across multiple systems, the Army would see a net reduction in training time because training on one system would provide some benefit for use on other systems. The Windows or Apple iPhone interfaces are examples of well-known tools that allow users familiar with them to operate a number of different applications on various devices with minimal training. There are efforts underway to consolidate some command, control and intelligence systems or migrate towards common interfaces, such as the Command Post Simplification managed by the Program Executive Officer for Command, Control, Communications and Technology and Operations Intelligence Convergence.[40] However, without trainability standards built into requirements documents and measured during tests, acquisition project managers under budgetary pressures have little incentive to cooperate on common standards that may be beneficial in the field, but often represent a higher upfront cost. This situation is worse for existing systems where changing a mature (and often proprietary) interface to something different may require a significant investment.

Conclusion

The Army's equipment is growing more complex, requiring more training time for Soldiers to master it. In addition to the time required to learn a new piece of equipment, units must ensure either regular use of the equipment or periodic refresher training to combat skill decay. The quantity of materiel per Soldier and per unit is also on the rise. This increase in equipment density combined with the growing complexity of that equipment is placing an increasing training burden on units. Training requirements that exceeded the time available to meet them in 2002 are continuing to grow.[41] To date, the Army has not actively managed these burdens. The implications are serious. Weapon systems that appear to perform well in testing may underperform in the field when placed in the hands of Soldiers that simply do not have enough time to train to the standard of the test unit.

Training time is more precious now than ever for two key reasons. First, as the overall military budgets decline, the Army is getting smaller. The service must work hard to maintain an adequate number of ready units at any given time to respond to contingencies. The number of ready units available is a function of the total number of units in the force, the time needed to train them to standard, and the training resources needed to execute that training. With total forces in the pool declining and training funds per unit holding steady (at best), how long units need to train up to full readiness is a critical variable. If the Army causes that timeline to grow longer, the number of ready units at any given time must fall. Conversely, if the Army could reduce the time required for units to become fully ready, the number of units available at any given time will grow.

Training time is also more precious today because the range of potential missions is larger. Most Brigade Combat Teams in the 1990s dedicated their entire training calendar to Mission Essential Task Lists that were focused on defeating major state armies in conventional warfare. Traditionally, the Army viewed stability operations and peacekeeping as lesser included missions, meaning that if units were trained to execute the more demanding decisive action operations, they could also handle stability operations.[42] The difficulties encountered in Iraq and Afghanistan led the Department of Defense (DoD) to recognize that this view was flawed. In 2009, the DoD elevated stability operations to make them coequal with offensive and defensive operations.[43] Army units need more training time in order to retain the hard-won lessons of counterinsurgency, build cultural awareness, and build partner capacity while also honing their edge for conventional warfare.

The Army needs to make a conscious effort to arrest and reverse the growing training burden on units. Doing so is an imperative for an Army that has to be prepared to execute a wide array of diverse missions such as decisive action and counterinsurgency. By addressing trainability early in the requirements process with metrics based on an understanding of the training time budget for using units, the Army can better incentivize industry to create better systems and more effective training packages. A more formal recognition by the Army of how much time different types of units require to become proficient in different tasks may generate much needed debate about missions and priorities. This process may also lead to innovations in training that allow the Army to become more efficient at its core task; providing ready units to combatant commanders.

Endnotes

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[17] Compiled from the Army Modernization Training Automation System, at https://amtas.logsa.army.mil/scripts/login.cfm?CFID=246492&CFTOKEN=53b9e3f6ebd145a3-6B642EF4-C389-EA32-73A5A1893958204C&jsessionid=4630bb188a8025c5f1975d5d361a1c144e73 (accessed March 3, 2014), and e-mail correspondence with New Equipment Training experts. David R. Rogers , e-mail message to the author, 27 November, 2013; Jeffrey S. Brundage, e-mail message to the author, 18 December, 2013; Michael R. Heckathorn, e-mail message to the author, 4 March, 2014; Daniel Dwyer, e-mail message to the author, 30 December, 2013; Michael A. Mercurio, e-mail message to the author, 17 January, 2014; George A. Roberts, e-mail message to the author, 2 March, 2014; Thomas D. Bradford, e-mail to the author, 27 February, 2014. Mr. Rogers works for the TRADOC Capability Manager for the Armored Brigade Combat Team and has worked with the Bradley NET Team since 1999. Mr. Brundage is a training specialist for the Army's Tank and Automotive Command responsible for Abrams NET. Mr. Heckathorn is the lead trainer for the Mortar Fire Control System at the Project Management Office for Mortars. Mr. Dwyer is the Lead System Integrator for the TRADOC Capability Manager for Brigade Combat Team Mission Command. Mr. Mercurio is Chief of Fielding for the U.S. Army's Project Manager, Tactical Radios. George Roberts is on the New Equipment Training Team for the Program Executive Officer, Chemical-Biological Defense. Thomas Bradford is the Deputy TRADOC Capability Manager for Fires and was involved in writing the CDD for AFATDS Increment 2.

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Platform (JBC-P) Revision 2 CPD, the NETT Warrior (NW) Ground Soldier System (GSS) Increment 1 CDD, the Global Combat Support System – Army (GCCS-A) CPD, the Joint Effects Targeting System (JETS), the Joint Tactical Radio System – Manpack CDD, and the Control System CPD.

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