Aviation Maintenance Training Opportunities

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Abstract

The research on Aviation Maintenance Training Opportunities is a literature review of documented U.S. Army training publications and methods compared with the Federal Aviation Administration's requirements for a certificated aviation mechanic. The National Defense and Army Modernization Strategies identify the need for organizations to improve the fielding of new capabilities and codify the changes in doctrinal updates. Multi-Domain Operation changes inform doctrinal updates, the changing organizational structure require additional analysis for optimization and improved training. The Army acknowledges the need to transform current doctrine, acquisition reform, and business processes. This research highlights a few areas for consideration; Advanced Individual Training improvements, updating of training development and synthetic training material, and overall review of the aviation mechanics Military Occupational Specialties. Current training practices reflect the capability of the Army for the 20th Century. New capabilities and rapid technological improvements require an adaptive aviation mechanic capable of 21st Century technology. The Army Aviation Maintenance Career Management Field study in 1980 resulted in the consolidation of aviation Military Occupational Specialties. The study areas were Aviation Force Structure, Personnel Management, Aviation Maintenance Training, and Army Aviation Maintenance. The ability to have agile, adaptive, aviation mechanics that can readily incorporate new capabilities and technological changes reside in the foundation of training. Training should begin with general aviation theories and practices, commensurate with the Federal Aviation Administration training requirements, followed by advanced training for critical tasks and inspections for a specific aerial platform. The conclusions and recommendations indicate a need for additional studies and analysis to inform doctrinal, organizational, and training updates by Fiscal Year 2023.

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Introduction

The Department of the Army's priorities includes modernization and with modernization follows fielding of new capabilities and materiel. In concert with the required integration of new and improved capabilities in the warfighter's domain, operators and maintainers must receive required training to operate and sustain new capabilities. In addition to the introduction of new capabilities, the Department of the Army is changing. Major General Mike Lundy identifies the criticality by stating, "Building and sustaining combat readiness is both a science and an art, requiring commanders, subordinate leaders, and staffs to use the operations process to develop and execute effective unit training plans." (Department of the Army, 2016, p. 2). Introduction of new capabilities because of modernization requires new training development packages, which can drive a new Military Occupational Specialty. In the aviation maintenance environment, Advanced Individual Training (AIT) is the genesis of Aviation Maintenance Training. The organizational, individual, and self-help training domains are utilized across the Department of the Army. The focus of this research is in the Individual Training Domain, otherwise known as Advanced Individual Training.

The Military Occupational Specialty for aviation training has not undergone a major change since circa 1980. The *Army Aviation Maintenance Career Management Field 67 Study* indicated an inadequate organizational structure, an ineffective MOS structure, an ineffective aviation maintenance-training program, and increased equipment complexity (Vines, Johnston Jr., Pratt, & Fee, 1980). Aviation Maintenance Training currently provides academic and hands-on training in general aviation support and specific airframe training such as for the UH-60 Blackhawk, CH-47 Chinook, and AH-64E Apache Helicopters. The Advanced Leaders Course and Senior Leaders Course are progressive skill courses. Hence, the only changes that have

occurred are due to the addition of new technologies and the application of new training methods.

In order for Aviation Maintenance Training to remain synchronized across the force, how the Army organizes and trains requires an in-depth review and potential changes. Anders Halskov-Jensen was quoted at an International Civil Aviation Organization (ICAO) event in 2014 stating, “That’s how we’ve always done it” the Army can ill afford to adopt this same rhetoric (2014, p. 4).

The Army Modernization Strategy (AMS) Framework (Fig 1) looks to 2035. “To achieve this end state by 2035, the Army will modernize how we fight, what we fight with, and who we are” (Department of the Army, 2019a, p. 1). Doctrine, organizations, training, materiel, leader development and education, personnel, facilities, and policy (DOTMLPF-P) will help identify these essentials of the AMS. “The Army will continuously update its doctrine, organizational designs, and training to conduct operations as a multi-domain force.” (Department of the Army, 2019a, p. 4)

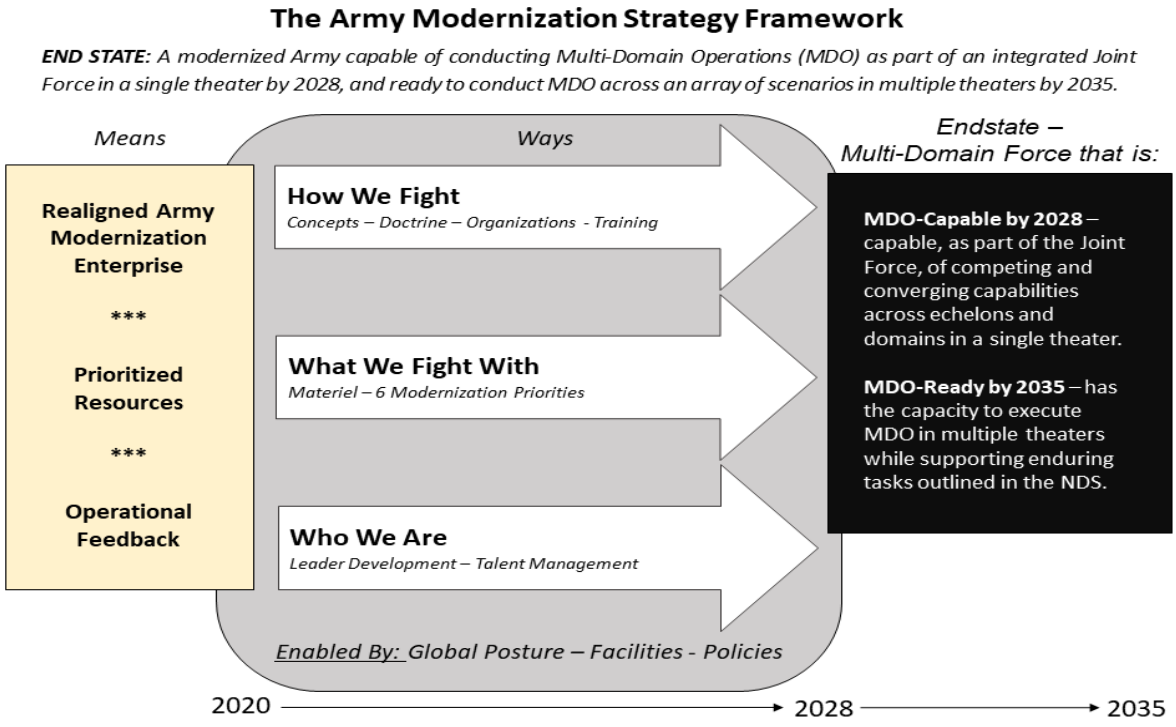

Figure 1 The Army Modernization Strategy Framework (Department of the Army, 2019a, p. 2)

The highly trained soldier is the man-machine interface that enables materiel to be a combat multiplier. New capabilities/materiel will always be in need to reach overmatch of U.S. enemies. "The complexities of emerging technologies and the global security environment, and the sophistication of our MDO concept, make that reliance all the greater" (Department of the Army, 2019a, p. 8). "If nobody remembers the reasons for `having always done it this way', perhaps it's about time to change something" (Halskov-Jensen, 2014). The trained soldier is a key enabler in the modernization of aviation maintenance.

Background

Multi-Domain Operations (MDO) will change Army doctrine. When doctrine changes AIT and organizational structures, changes in aviation maintenance will follow. Aviation Maintenance Training is an area that has potential for optimization and may further benefit from

a dialogic approach, inclusivity of the workforce to problem solve and organize should not be overlooked. The bottom line is, “The training model that worked in the past must be adjusted going forward” (Morris, 2019, p. 1). “The Army must look beyond just the material solutions and focus also on the necessary facilities and training” (Morris, 2019, p. 2). Aviation maintenance training must be adaptable with the MDO environment.

Problem Statement

Given emerging threats and rapid capability fielding of aviation materiel, how can the U.S. Army restructure and optimize Advanced Individual Training for aviation maintainer’s in-order to minimize the institutional training time required and increase availability of maintenance personnel to support how the U.S. Army organizes and fight’s.

Research Questions

How can aviation maintenance optimize to support new capability fielding and Multi-domain Operations (MDO) to meet near-term and mid-term threats?

What commercial aviation maintenance structures can the U.S. Army adopt to support upcoming changes with regard to the Army Modernization Strategy?

What changes in training would support optimization of aviation maintenance?

Conclusion

A change in National Defense and U.S. Army priorities creates the assessment and experimentation for significant transformation of business processes and practices. Aviation Maintenance Training is one small part of the entire overarching strategy. A new training approach or optimization of the aviation career field structure is consistent with organization restructure for Multi-Domain Operations. System level change is the time to evaluate and institute broad change in the operational and training domains. In forty years, the national

defense strategy has changed multiple times as well as the materiel and acquisition strategies for modernization and rapid capability fielding. The research on Aviation Maintenance Training will consist of a literature review of current aviation training standards, commercial A&P training standards, and training impacts for introduction new materiel. Analysis of the literature will compare and contrast Army aviation training standards to commercial aviation standards. The analysis will also evaluate organizational structure for an aviation maintenance unit and unit training for gaps to consider in optimization. That analysis will conclude with recommendations from synthesizing the information in the literature review.

Literature Review

National Defense Strategy

The 2018 National Defense Strategy (NDS) depicts how the Department of Defense (DoD) will support the National Security Strategy (NSS). The Department of Defense has outlined a strategy that will require an improved approach to how the DoD operates, collaborates, and fields new materiel to support an overmatch capability. Opposing nations have been increasing their military force and capabilities while the U.S. has been engaged in the Middle East. During these engagements, "Some competitors and adversaries seek to optimize their targeting of our battle networks and operational concepts" (Department of Defense, 2018, p. 3). The NDS calls for "Continuously delivering performance with affordability and speed as we change Departmental mindset, culture, and management systems" (Department of Defense, 2018, p. 4).

To adapt to re-emerging global powers and newer threat, three lines of effort are identified in the National Defense Strategy to regain a competitive adavantage.

- First, rebuilding military readiness as we build a more lethal Joint Force;
- Second, strengthening alliances as we attract new partners; and
- Third, reforming the Department's business practices for greater performance and affordability. (2018, p. 5)

Increase Readiness

The NDS has identified the desire and the comitment to increase readiness. Readiness is increased by a reduction of usage, an increase in money, manpower, or materials. The NDS specifically states, "We will make targeted, disciplined increases in personnel and platforms to meet key capability and capacity needs" (Department of Defense, 2018, p. 6). The statement

further quantifies readiness drivers, “Investments will prioritize prepositioned forward stocks and munitions, strategic mobility assets, partner and allied support, as well as non-commercially dependent distributed logistics and maintenance to ensure logistics sustainment while under persistent multi-domain attack” (Department of Defense, 2018, p. 7). Additional investments in logistics, training, and materiel will aid increased readiness. “We will continue to leverage the scale of our operations to drive greater efficiency in procurement of materiel and services while pursuing opportunities to consolidate and streamline contracts in areas such as logistics, information technology, and support services.” (Department of Defense, 2018, p. 10).

Reform Practices

Change continues to be a theme in the 2018 NDS especially the change in culture, doctrine, and business processes. “Cultivating a lethal, agile force requires more than just new technologies and posture changes; it depends on the ability of our warfighters and the Department workforce to integrate new capabilities, adapt warfighting approaches, and change business practices to achieve mission success.” (Department of Defense, 2018, p. 7). “Delivering performance means we will shed outdated management practices and structures while integrating insights from business innovation.” (Department of Defense, 2018, p. 10). The call for change is placed at the leaders hands and requires courage and deliberate planning to achieve the end state.

> If current structures hinder substantial increases in lethality or performance, it is expected that Service Secretaries and Agency heads will consolidate, eliminate, or restructure as needed. The Department’s leadership is committed to changes in authorities, granting of waivers, and securing external support for streamlining processes and organizations. (Department of Defense, 2018, p. 10)

Additional research by each functional domain is required to achieve reform among their business processes and practices, the call to reassess the DOTMLPF-P should identify the needs of the service for reform practices.

> Evaluate how the evolving character of war will impact the strategic environment across all domains, and how the Army and the Joint Force should adapt in key doctrine, organization, training, materiel, leadership, personnel, facilities, and policy (DOTMLPF-P) areas. Assess key inhibitors to needed change and possible ways of dealing with them. (Department of the Army, 2018b, p. 3)

Multi-Domain Operations

"To win tomorrow, we must evolve how we organize and integrate the Army as part of the Joint Force" (Department of the Army, 2019a, p. iii). To achieve this the 2019 Army Modernization Plan provides four actions:

> (1) Continue to refine a warfighting concept that provides our azimuth to the future--*The U.S. Army in Multi-Domain Operations 2028* is that concept; (2) Develop a comprehensive Army modernization strategy linked to this concept and synchronized with a joint approach to force development; (3) drive rapid, non-linear solutions in Army doctrine, organization, training, material, leadership and education, personnel, facilities, and policy; (4) deepen the operational integration of general purpose and special operations forces and with our allies and partners. (Department of the Army, 2018c, p. iii)

Success of Multi-Domain Operations (MDO) hinges on increasing training and education of personnel. "The Army builds and sustains multi-domain formations through the selection, training, and education of the leaders, soldiers, and teams in them." (Department of the Army, 2018c, p. x). Today's junior grade personnel will be in the positions of leadership and

responsibility when the implentation and expectation of the Army's Modernization Strategy goes into effect.

> The Army will pursue every opportunity to rapidly integrate MDO into our evolving doctrine. Additionally, the use of experimentation, war gaming, and analysis will inform the organizational design, materiel solutions, and training requirements for the MDO ready force. Units will train for MDO using the new Synthetic Training Environment capabilities at home station, and redesigned combat training centers will enable the collective training of units at echelon to conduct MDO. (Department of the Army, 2019a, p. 4)

Rapid Fielding

Incorporation of new technologies to support Irregular Warfare (IW) will come at a more rapid pace. The fact that much of the U.S. Army's innovation comes from the commercial sector means that U.S. allies have access to the same technologies. The speed with which the DoD can integrate new technologies will enable the U.S. to widen or maintain its competitive technological advantage. "Our response will be to prioritize speed of delivery, continuous adaptation, and frequent modular upgrades" (Department of Defense, 2018, p. 10). Modification of doctrine and training will support rapid fielding of Warfighter capabilities as outlined in the 2019 Army Modernization Strategy, "Streamline rapid, iterative approaches from development to fielding" (Department of Defense, 2018, p. 11).

The continuous change in battlefield operations requires the need for a more agile force. New technology insertion is part of the dynamic that will ensure success of the Army modernization strategy. This can be achieved by, "Establishing precision logistics that provides a reliable, agile, and responsive sustainment capability necessary to support rapid power

projection, Multi-Domain Operations, and independent maneuver from the Strategic Support Area to the Deep Maneuver Area" (Department of the Army, 2018c, p. xi).

To maintain the competitive advantage requires the update of doctrine to effectively incorporate rapid prototyping and rapid fielding activities in support of Army modernization. Doctrine will establish the parameters on how the U.S. Army fights and what equipment used to fight with, which leads to how the Army trains. "This requires new tools to more rapidly converge capabilities across the Joint Force, shifting training paradigms, and changing personnel and talent management practices" (Department of the Army, 2019a, p. xi). Doctrine must address the organizational structure in-order to meet the requirements of MDO. "This also requires that Army formations be trained, manned, and equipped to leverage all available information, from national, joint, commercial, and Service repositories and libraries, or directly from collection assets seamlessly and in a time dominant manner" (Department of the Army, 2018c, p. xi).

Training Structure

Army Regulation 350-1, Army Training, and Leader Development; dated 10 December 2011, defines the U.S. Army's Strategic training goals.

> The Army's Strategic Goal is to provide the Joint Force Commander (JFC) with the capabilities to dominate the full spectrum of operations. Training must address the Joint context and follow the concepts and implementation guidelines in Department of Defense (DoD) Training Transformation. (Department of the Army, 2011, p. 1)

The Army further states that force pools will be used to develop training models. "The Army will use force pools, in addition to mission requirements, to prioritize resources over time and synchronize unit manning, equipping, resourcing, and training" (Department of the Army, 2011,

p. 1). The Army Force Generation (ARFORGEN) was developed in the 2009 Army Campaign Plan and the model is depicted in Figure 2 (Department of the Army, 2011).

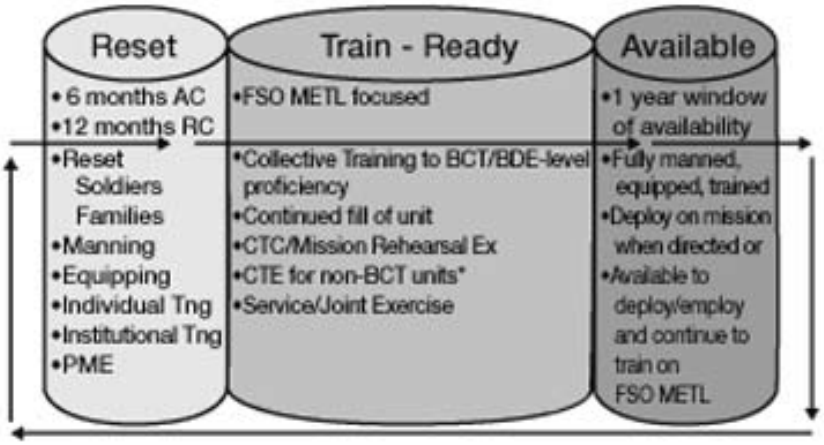

Figure 2 ARFORGEN Operational Readiness Cycle (Department of the Army, 2011, p. 2)

The ARFORGEN Model drives individual training as well as institutional training. The reason for the focus on the force pool are, "Units in the Reset force pool have no readiness expectations" (Department of the Army, 2011, p. 2). Activities of, "Units in the Reset force pool perform the following activities: Soldier-Family reintegration, block leave, unit reconstitution, changes of command, select individual training tasks, professional military education (PME), and receive new personnel and equipment" (Department of the Army, 2011, p. 2). Expectations of training in the Reset force pool establishes a priority for fielding new equipment. This allows the units time to become familiar and train on new capabilities and technologies in advance of deployment into a combat zone. "Units in the Train-Ready force pool will increase training readiness and capabilities as quickly as possible, given resource availability" (Department of the Army, 2011, p. 2).

Challenges in Army training are recognized in AR 350-1 and futher documents how challenges will be met. "The Army's training challenge is to optimize, synchronize, and support

training in schools, training in units, and self-development training to produce forces capable of responding across the spectrum of operations" (Department of the Army, 2011, p. 2). This includes the three training domains of operational, institutional, and self-development. All of which are interdependent to meet the training needs of all individuals. The domains, "must be synchronized in order to achieve the goal of trained Soldiers, Army civilians, leaders, and ready units" (Department of the Army, 2011, p. 3). "Training in each domain provides important, progressive, and interlocking professional experiences that ultimately reflect in the unit's overall training readiness and its ability to conduct unified land operations" (Department of the Army, 2019b, pp. 4-9).

Institutional Training is the beginning of soldiers initial training environment also known as Advanced Individual Training (AIT). "The institutional training domain includes Army centers/schools that provide initial training and subsequent functional and professional military education for Soldiers, military leaders, and Army civilians" (Department of the Army, 2011, p. 4). Advanced Individual Training for Aviation Maintenance Training takes place at Fort Eustiss, VA and the courses vary from 13 to 23 weeks depending on the aviation platform for the Military Occupational Specialty (MOS). Army schools have a major respsonsibility as technical training is introduced to newly trained soldiers that have not yet arrived at their first unit. The U.S. Army Training and Doctrine Command (TRADOC) has the repsonsibility to;

> (1) Conduct initial training for Soldiers and Army civilians that instills common values, ethics, and warrior ethos/civilian creed; qualifies individuals on common tasks; qualifies individuals on the critical tasks of their assigned occupational specialty; and produces highly motivated and disciplined individuals. (2) Conduct training that qualifies individuals for a military occupational specialty (MOS), area of concentration (AOC),

> additional skill identifier (ASI), skill identifier (SI), special qualification identifier (SQI), or language identification code (LIC). When required, Army schools will provide training support packages to support awarding these identifiers/codes. Similarly, Army schools provide reclassification training for changing an enlisted MOS, to qualify a warrant officer (WO) or an officer in a new branch. (Department of the Army, 2011, p. 5)

The operational training domain takes place at the unit level which, "encompasses training activities that individuals, units, and organizations undertake" (Department of the Army, 2011, p. 4). The activities that soldiers engage in during operational training are important as this trains each individual on how to conduct tasks in an operational environment. Activities include, "training conducted at home station, during major training events (to include Joint exercises) at combat training centers and other locations (to include mobilization centers), and while operationally deployed" (Department of the Army, 2011, p. 4). The information and after action reports are collected and consolidated and shared across the training domains in-order to improve upon individual and institutional training.

The self-development training domain is crucial to the motivated soldiers' desires and need to increase proficiency. The entire Army training structure is cultivated on continous learning and units can ill-afford to send soldiers to formal schools for all training needs. "The self-development training domain recognizes that Army service requires continuous, life-long learning and that structured training activities in Army schools and in operational units often will not meet every individual's need for content or time." (Department of the Army, 2011, p. 4)

Limited resources and the introduction of new materiel and modernized equipment further challenge the training structure. TRADOC Pamphlet 350-70-13, System Training Integration directs responsibility to the Training and Education Developer (TNGDEV). "The

TNGDEV devises training strategies and plans for new equipment training; displaced equipment training; current and emerging doctrine; and doctrine and tactics training (DTT)" (Department of the Army, 2014, p. 10). The resources required for this effort are extensive and introduced early in the acquisition of new materiel and capabilities. Examples of the categories are below in Figure 3.

Figure 3 Training Support System Resources (Department of the Army, 2014, p. 10)

New Equipment Training

New Equipment Training (NET) is the training required to introduce new and emerging technologies and capabilities to the field. "NET accomplishes the transfer of knowledge on the operation and maintenance associated with the fielding of new, improved, or displaced equipment from the materiel developer (MATDEV) to the tester, trainer, supporter, and user."

(Department of the Army, 2014, p. 20). MATDEVs begin incorporation of training development as early in the Joint Capabilities Integration and Development System (JCID)s process as necessary see Figure 4.

> Institutional training on new systems is implemented in Army centers and schools to provide trained replacements to units to operate and support new systems. Proponents must ensure institutional training starts in sufficient time to provide trained replacements for the first units equipped with the system. (Department of the Army, 2014, p. 22)

The training concept and strategy are key to fielding new materiel. Low Rate Initial Production lots begin fielding during formal institutional training development. The planning process throughout the JCIDS for training is indicative of the larger training system and an approach that must be adaptable and modifiable for new equipment introduction.

> The system training concept and strategy describes what, how, when, and where Soldiers' skills, knowledge, and attributes are acquired. Determining a training concept and strategy are key events in the process of identifying what training support capabilities will be required to support a new capability. (Department of the Army, 2014, p. 26)

Figure 4 represents the Systems Training Integration that correlates which integrates training during the acquisition process. The management and merger from systems development to integration is a difficult task, “Each of these three processes is represented by communities of interest that often have inconsistent priorities and timelines” (Department of the Army, 2014, p. 8).

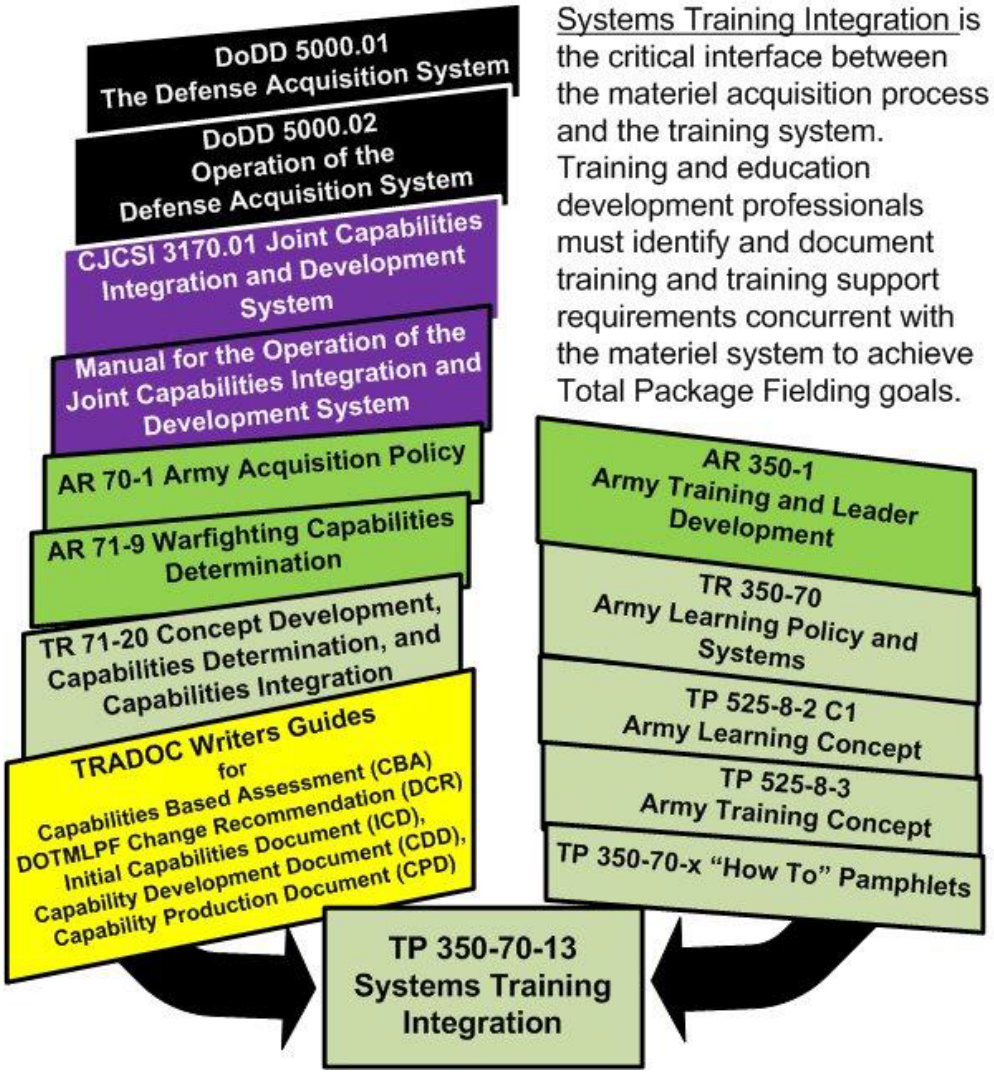

Figure 4 Systems training integration policy and guidance (Department of the Army, 2014, p. 8).

Figure 5 represents the overarching training involvement throughout the Joint Capabilities Integration and Development System (JCIDS) process. The JCIDS process as shown in TRADOC Pamphlet 350-70-13 from 2014 shows the training development beginning during the Analysis of Alternatives phase and continuing through production and deployment. The training process repeats for each modification and refinement to the weapon system. The Acquisition Framework in (Fig 5) is from 2014; the new acquisition framework released in 2019 does not capture the training development milestones, which should catch up during the next release.

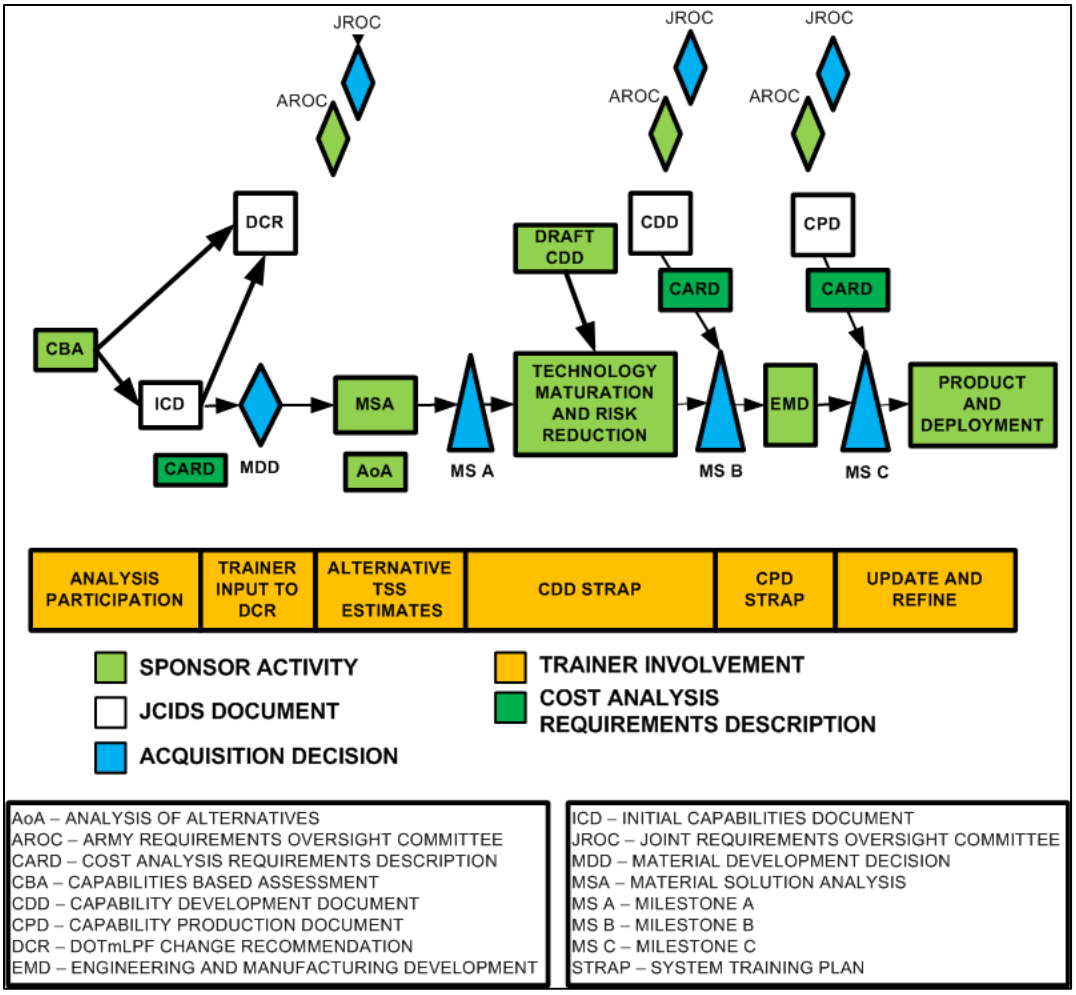

Figure 5 JCIDS process training developer involvement (Department of the Army, 2014, p. 27).

NET is required before materiel officially transfers to a unit. The Program Executive Office (PEO) and or the Program Manager (PM) designated as the MATDEV provide coordination and training. “The PEO or PM facilitates the transfer of knowledge about equipment use and support requirements from the materiel developer to the users, trainers, and maintainers of the new equipment” (Woods, 2010). The PEO and PM NET teams can coordinate with the Army Field Support Battalion (AFSB) to arrange NET support to the gaining units for both operation and maintenance training. New Equipment Training is the method for the transfer of knowledge for newly developed capabilities, which includes employment, operation, sustainment, and maintenance. The planned deliberate effort is imperative to succeed in-order for

the unit to fully employ and operate with the new technology. “When fielding complex new equipment to a unit, there’s only one chance to get it right. If the training is off—in content, timing or audience—the unit can end up worse than it was without the new gear.” (Swan, Jordan, & Spence, 2014, p. 1). The timing of NET is a key factor on the successful fielding of a new technology, more important NET includes the necessary training and materials for the AFSB to tactically employ and sustain the capability set.

Aviation Maintenance Training Program

The U.S. Army Aviation Center of Excellence (USAACE) is a proponent of TRADOC. The publication of Training Circular (TC) 3-04.71 provides guidance and instruction on the Aviation Maintenance Training Program (AMTP). “TC 3-04.71 shapes the way the Army trains and develops aviation maintainers and leaders” (Department of the Army, 2018a, p. v). Aircraft maintenance is a critical skill that has detrimental consequences to life and equipment if not performed correctly or appropriately. The emphasis for Aviation Maintenance Training due to current operating environments and demand in a wartime environment cannot be understated. The importance of the AMTP need is quantifiable and publication of TC 3-04.71 in 2018 categorizes three phases for implementation. Phase I requires commanders and maintenance leaders to implement training compliance starting in FY18. Phase II begins with quality control evaluation of technical inspectors that in-turn evaluate individual maintainers by FY20. Phase III is full program implementation and becomes a program of record by FY21. (Department of the Army, 2018a).

The AMTP design is to provide technical proficiency, individual progression, standardized task requirements, and standardized maintenance training and training records (Department of the Army, 2018a). “Maintainers are any Soldier or DAC technician with a

military occupational specialty (MOS)" listed in Table 1 (Department of the Army, 2018a, pp. 1-1).

MOS / DAC Series	Title
15B	Aircraft Power plant Repairer
15D	Aircraft Powertrain Repairer
15E	Unmanned Aircraft Systems Repairer
15F	Aircraft Electrician
15G	Aircraft Structural Repairer
15H	Aircraft Pneudraulics Repairer
15N	Avionic Mechanic
15R	AH-64 Attack Helicopter Repairer
15T	UH-60 Utility Helicopter Repairer
15U	CH-47 Cargo Helicopter Repairer
15Y	AH-64D Armament/Electrical/Avionic Systems Repairer
1825	Aviation Safety Series
2606	Electronic Industrial Controls Mechanic
2892	Aircraft Electrician
2854	Electrical Equipment Repairing
3806	Sheet Metal Mechanic
3819	Airframe Jig Fitting
3869	Metal Forming Machine Operating
3872	Metal Tube Making, Installing, and Repairing
4818	Aircraft Survival Flight Equipment Repairing
5378	Powered Support Systems Mechanic
5485	Aircraft Weight and Balance Operating
6652	Aircraft Ordnance Systems Mechanic
8268	Aircraft Pneudraulic Systems Mechanic
8602	Aircraft Engine Mechanic
8810	Aircraft Propeller Mechanic

Table 1 MOS and DAC Technicians (Department of the Army, 2018a, pp. 1-2)

The AMTP has four components to Institutional Training: Advanced Individual Training, Advanced Leaders Course, Senior Leaders Course, and other Institutional Training courses identified in Appendix B of TC 3-04.71. The AMT journey begins at AIT for the Military Occupational Specialty (MOS) for the specific airframe specialty. AIT training is conducted at

Fort Belvoir, VA and the course length varies from 13-23 weeks depending on the MOS. Successful completion of AIT allows an individual to arrive at the duty station and begin apprenticeship in the Operational Domain. “The gaining aviation unit commander assumes the responsibility for enhancing and expanding the training Soldiers received in AIT” (Department of the Army, 2018a, pp. 2-2). Operational training will increase the apprentices’ knowledge, skills, and abilities while incorporating warfighter tasks with Individual Critical Task List’s (ICTL). Mastery of the ICTL10-20 is a requirement for progression as a senior or master maintainer (ICTL30-40) (Department of the Army, 2018a) and attends the Advanced Leaders Course for promotion to Staff Sergeant.

> The Advanced Leaders Course (ALC) is a branch-specific course designed for the Soldier’s MOS and is normally conducted at the MOS proponent school. Completion of ALC is a requirement for promotion to Staff Sergeant and is required for most ICTL30 positions within a typical aviation battalion. This course provides Soldiers with an opportunity to acquire the leader, technical, and tactical skills, knowledge, and experience needed to lead squad/platoon size elements. (Department of the Army, 2018a, pp. 2-2)
>
> The Senior Leaders Course is a branch-specific course designed for the Soldiers MOS and is normally conducted at the MOS proponent school. Completion of Senior Leaders Course is a requirement for promotion to Sergeant First Class and is required for most ICTL40 positions within a typical aviation battalion. This course provides an opportunity for Soldiers to acquire the leader, technical, and tactical skills, knowledge, and experience needed to lead platoon/company size units. (Department of the Army, 2018a, pp. 2-2)

Figure 6 represents a typical career map for an AMT this specific example is what is required for MOS 15E unmanned aircraft systems repairer (Department of the Army, 2018a).

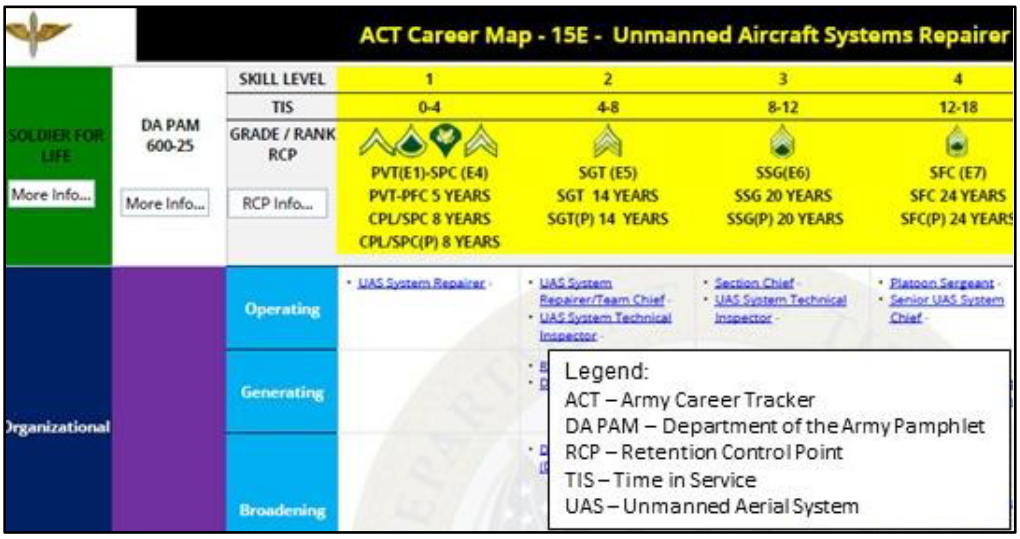

Figure 6 Army Career Tracker Career Map Example (Department of the Army, 2018a, pp. 2-4)

Soldiers that want to expand their knowledge, skills, and abilities to other aerial platforms must reclassify into another MOS. “Soldiers reclassifying into an aviation maintenance MOS are at a significant disadvantage. Reclassifying Soldiers will not be assigned directly to the QC section or as a section sergeant” (Department of the Army, 2018a, pp. 2-5). The avenue for reclassification consists of attending AIT for the MOS in additional to self-development courses and additional repair work to meet ICTL30 or ICTL40. (Department of the Army, 2018a).

The Aviation and Missile Command host a Worldwide Aviation Logistics Conference every year to discuss critical readiness and sustainment issues surrounding Army Aviation. The 2018 Worldwide Aviation Logistics Conference (WALC) focus was to “streamline aviation maintenance and sustainment in the 21st century” (Frederick, 2018). Jacob Medeiros in an Article for Aviation Digest discusses how Army Aviation can benefit by changes in the structure “Army aviation could significantly improve upon operations for very little relative cost by changing the internal structure of its units” (2019, p. 25). Medeiros further explains the need for

training changes at the Combat Training Centers and to be successful should "…task organize into Aviation Battalion Task Forces (ABTFs)" (2019, p. 24)

> In the Army, it is common practice for units to strive to train how they fight. If aviation units deploy and fight, as ABTFs, then they should permanently task organize that way during all day-to-day operations. If every organic aviation battalion modularized by including CH-47s, UH-60s, HH-60s, AH-64s, and unmanned aircraft systems (UAS), it would streamline operations, putting units in a better position to successfully mobilize in a decisive action scenario. (Medeiros, 2019, p. 26)

Virtual Training

Advanced Individual Training compliments individual task training with maintenance devices to simulate a Virtual Interactive Training environment. The Army contracted with LSI, Inc. to develop maintenance-training devices using crash damage and battle damage aircraft. The simulated aircraft allows for a variety of task performance for qualification of the MOS ICTL range from 10 level to 40 level tasks, Maintenance Operation Checks, and fault isolation (LSI, Inc., n.d.). Maintenance Training devices include Airframe trainers for the UH-60 Blackhawk, CH-47 Chinook, AH-64E Apache, and other aircraft subsystems. The maintenance training devices provides a valuable hands-on approach to maintenance training but only available at the proponent school for MOS AIT. Training at the organization does not have access to the maintenance training devices provided at AIT. Other training as identified in the AMS is Synthetic Training Environments.

The Army Future's Command through Cross-Functional Teams (CFTs) signature efforts for Synthetic Training Environment (STE) includes STE Information Systems, Reconfigurable Virtual Collective Trainers, Squad Immersive Virtual Trainers, and One World Terrain Program

(Department of the Army, 2019a). The STE CFT in conjunction with Program Executive Office for Simulation, Training, and Instrumentation and has been extremely successful in moving forward with STE for aviation operators; however, research did not provide any evidence that STE for the AMT is to be developed. Additional research conducted to identify unit-enabled maintenance training devices, STE, Virtual Reality or distributed computer based training programs for ICTL execution resulted in no data available.

Commercial and FAA Aviation Training Standards

Commercial aviation maintenance training as governed by the Federal Aviation Administration (FAA) and codified in Federal Aviation Regulations (FAR). Title 14 Code of Federal Regulations (CFR) defines the methods and qualifications for obtaining an Airframe and Powerplant (A&P) certification or license. The FAR Part 147 documents three ways to become a certified A&P; one, attend an Aviation Maintenance Technician Schools; two, on-the job training while working for an FAA Repair Station or Fixed Base Operator (FBO); three, join the military with a job as an aviation mechanic. All three of these efforts have requirements as documented by the FAA.

Formal schools offer training consistent with standards as documented in FAR part 147; course curriculum includes avionics, electronics, instrumentation, powerplant, structures, and general aviation equipment training. The formal schools do not produce an aviation mechanic but provides the knowledge and training to operate as a mechanic in order to ascertain a license and certification, which requires an exam administered by the FAA.

This requires a high school diploma or a General Education Diploma (GED) to get in to most schools. Duration is from 12 months and 24 months, generally less than required by

FAA for on-the-job training. Upon graduation, the individual can take the FAA's exam for certification. (Federal Aviation Administration, n.d.)

On-the-job training is another method to obtain an A&P license. The requirement for this method are defined as,

> The second method is on-the job training while working for an FAA Repair Station or Fixed Base Operator (FBO) under the supervision of a certified mechanic for 18 months for each certificate, or 30 months for both. Experience must be documented with pay receipts, a logbook signed by the supervising mechanic, a notarized statement from the employer, or other proof that documents the time required. (Federal Aviation Administration, n.d.)

The FAA also provides a third step, which is a combination of the first two steps. Military Individuals in an MOS as recognized by the FAA and maintained at the Flight Standards District Office (FSDO) can gain an A&P license by acquiring,

> An official letter from the military employer certifying length of service, the amount of time worked in each specialties, the make and model of the aircraft or engine on which you got practical experience, and where you got the experience. Training time does not count for on-the-job training time, only the time spent working in the specialty. (Federal Aviation Administration, n.d.)

In addition, the FAA recognizes that attainment of an A&P license is not enough. The A&P license identifies the basic skills and knowledge, and is a license to learn. Due to the learning process of an A&P mechanic, the FAA through the FAR identifies that experience for an A&P can vary substantially. "Therefore, repair stations need proper initial and recurrent training to ensure persons are capable of performing assigned tasks, even when the majority of

the workforce may be certificated under 14 CFR part 65" (U.S. Department of Transportation Federal Aviation Administration, 2012).

Research Methodology

The development timeline for aviation maintenance training requires considerable time and extensive use of contractors to maintain new aviation equipment entering the U.S. Army. The U.S. Army has developed a modernization strategy highlighting six materiel priorities to meet a 2035 Multi-Domain Operation. Research of aviation maintenance training in the Department of the Army (DA) and the commercial sector provides literature for evaluation of training and certification differences for optimization. Review of standard training requirements of the U.S. Army aviation Military Occupational Specialties and the FAA requirements for development of aviation mechanics leads to extensive documentation on DA regulations, manuals, directives, pamphlets, training circulars, and articles related to the training process, training gaps and standards. Extensive library sources were pursued for information in this category. The utilization of Defense Technical Information Center (DTIC), the Army Publications Directorate (APD), and Army.mil provides the majority of information related to government documents in the form of research papers, manuals, regulations, and government publications. Other online library resources consist of Google Scholar, Google Search, EBSCO Host, Webster University, Columbia College, and FAA.gov.

Literature Review and Approach

The literature review and approach focus on the needs/impact of realigning aviation maintenance training that supports the NDS, AMS, and FAA training requirements for an Airframe and Powerplant (A&P) license applicable in a military or civilian aviation maintenance facility. First, review documentation that drives a need for business and process reform with respect to U.S. Army training. Second, identify the current training development and requirements for aviation maintenance training. Third, review commercial aviation training

requirements established by the Federal Aviation Administration and training delivery systems. Finally, compare and contrast the commercial requirements to the U.S. Army standards to identify opportunities for optimization. Literature for the review began in 1980. *Army Aviation Maintenance Career Management Field 67 Study* was the last major effort to realign maintenance career fields to improve readiness and training while minimizing the Military Occupational Specialties (MOS) associated with aviation maintenance training. The intent of the review and approach is to look at how Army training can realign to enhance new aviation capability fielding to meet MDO 2035 and beyond.

Limitations of Research

The time allotted for the research on this subject is the greatest limitation on this study. New studies and articles regarding modification of training for future capabilities and operating in a Multi-Domain environment grow daily. The speed at which the Department of the Army integrates new capabilities and faces emerging threats requires a more adaptive and resilient training structure that can rapidly integrate new capabilities with minimal time and disruption. The time allotted for research is diminished by a rigorous schedule of the Senior Service College Fellowship program of travel, industry engagements, seminars, and conferences.

Analysis and Findings

The NDS has a prominent theme of change. Change in internal business practices changes how we deliver performance, which influences our ability to efficiently field new capabilities and technology. The doctrinal updates require a change in the culture and mindset for training domains to enable rapid deliverable and developmental products. The strategy additionally calls for additional investments in training and materiel in the pursuit of procuring material and services required to streamline contracts and information technology. Doctrinal changes in strategy require a system level approach. One of the six Army Modernization priorities is Future Vertical Lift. Considering the training development planning for aviation mechanics in the fielding of a new weapon system without consideration of organizational structure changes in the Army Modernization Strategy is a subsystem approach that will be inefficient. The U.S. Army Training and Doctrine Command can easily expect the MATDEV to make all of the changes necessary although the myopic view will result in how we have always done things.

Consolidation of Aviation Maintenance

The NDS calls for reforming practices as a requirement to produce and cultivate an agile force that is more than just technology. It specifies the ability of the warfighter to integrate new capability includes reorganization and drives a change in business practices to achieve success. The Secretary of Defense acknowledges that large-scale change requires consolidation, elimination, or restructuring and stands by to support service secretaries and leaders (Department of Defense, 2018).

The DOTMLPF-P assessments, with schedule, experimentation, concept testing, and analysis during the FY20 - FY22 period will inform changes to doctrine which will then be incorporated across all domains to support the Army modernization strategy to be implemented

by FY 2028. The ability to reform these practices and domains in a time manner to support the U.S. Army's role in MDO's and to support the Army's modernization strategy requires nonlinear solutions with respect to DOTMLPF-P. "Training centers will adapt to accept echelons from brigade through field army. The Army will field systems such as the Optionally Manned Fighting Vehicle and the Future Attack Reconnaissance Aircraft" (Department of the Army, 2019a, p. 11). Sustainment success of the modernization strategy depends on the training and education of personnel.

In comparison, the FAA's policy on aviation maintenance technician training is to train general aviation mechanics. The general aviation training teaches the basic skill sets and requirements needed to conduct general and routine tasks on aviation platforms and understand how the tools, policies, and technical manuals effects positions and jobs. In addition, the airframe and powerplant mechanic garners additional experience when going to work for an agency that performs modification, repair, or overhaul. A superior oversees their work and provides them specific training on the airframe platform. This type of training creates a pool of airframe and power plant mechanics at the lower level, which corresponds with the Army skill level one or two in any of the aviation mechanic MOS's. Airframe and powerplant mechanics in addition can grow into an Army skill level three or four by achieving status with airworthiness authority and understanding the ability for quality assurance and quality control. This will ensure all work processes and procedures are accomplished in accordance with technical manuals and safety procedures. In contrast, this 30 month training and certification of an airframe and powerplant mechanic is much a longer duration for training for general aviation than that of the Army soldier in AIT for 13 to 23 weeks.

Synthetic Training

Data on maintenance training devices and Synthetic Training Environments may not be present to support AMT in the Operational Domain. Key enablers for AMTs are to show progression and certification in task competencies. The absence of training devices and environments prohibits the AMT from conducting training outside of conducting maintenance. Operational units may find that maintenance training on operational aircraft is not in their best interest as this could increase maintenance-induced faults that have a negative effect on readiness. The Army Modernization Strategy calls for units to train utilizing Synthetic Training Environments (Department of the Army, 2019a). The new Synthetic Training Environment (STE) Cross Functional Team engages in virtual collective trainers and One World Terrain Programs; however, data was not present to support the addition of STE in aviation maintenance training.

New Equipment Training

The NDS calls for delivering performance at the speed of relevance, continuous adaptation, and frequent upgrades (Department of Defense, 2018). In review of the National Defense and Army Modernization strategies, the Army seeks to have a streamlined rapid iterative approach to development and fielding. The ability to adapt the NDS and the AMS to rapidly field and deliver new capabilities and products identifies the need for doctrine and training changes. The Army's priorities as readiness, modernization and reform all meet the intent of the National Defense and Army Modernization strategies. The ability to adapt to these rapid changes requires updates of doctrine and business processes in the training structure and formations of Combat Aviation Brigades to support aviation maintenance training. Comparing the strategy requirements of a "rapid iterative approach" to the standard acquisition process,

identified in Figure 5, does not leave the allotted time for training development to occur from the beginning to the end of new developmental materiel.

Modernization of existing equipment to be employed in current and existing units with military occupational specialties already capable of supporting can be met with NET during the fielding process and can occur in deployed environments verses reset pools as indicated in AR 350-1. “The likelihood of a successful fielding increases, as does the ability to employ the new capability effectively, if unit fielding is synchronized with the U.S. Army Forces Command during a period that minimizes distractions from external missions” (Swan, Jordan, & Spence, 2014, p. 10). Introducing a new capability, such as Future Vertical Lift, requires the development and creation of a new MOS. The current force training structure in accordance with AR 350 - 1 does little to support the NDS or AMS. The latest publication update of AR 350 - 1 was in December of 2009 and the last rapid revision in 2011. The training structure has a goal of utilizing force pools for the fielding of new equipment and capability and this is not commensurate with employing rapid capability to deployed units. The training structure readily references the ARFORGEN model replaced in 2017 by the Sustainable Readiness Model. While the challenges and tenets of the training structure in AR 350–1 are still valid, the approach in how to accomplish given strategies requires a significant realignment. The institutional training for aviation maintenance varies between 13 and 23 weeks of advanced individual training. AMT development principles require a new specialist to receive training on individual critical tasks in-order to perform upon arrival to the unit. The task designs enable an AMT to reach a proficiency standard for each aerial platform per MOS. To accomplish this type of training requires significant time and multiple MOS’s for each aerial platform. “Soldiers train to individual tasks which are clearly defined, observable, and measurable activities accomplished by an individual.

These individual tasks enable Soldiers to master the necessary fundamental skills to fight and win" (Department of the Army, 2019b, pp. 1-1). While these tasks are important for the proficiency of new specialists, there is a redundancy among general aviation tasks for each AIT per MOS. Contractor developed NET training is sufficient to support contractor logistics support on the battlefield and for training of First Unit Equipped in the delivery of new materiel. Training development during the acquisition phase continues after new equipment fielding developing a more formalized program that meets TRADOC requirements.

New Study

Aviation Maintenance Training is rigid with duplication of effort in each MOS. The time required for Advanced Individual Training (AIT) for each MOS varies in length from 13 to 23 weeks. AIT delivers a new soldier to the organization with a skill level 1; meaning soldiers are now ready to receive on-the-job training with the associated airframe for which soldiers have training. The soldier pursues self-development training and meets certification requirements to advance to a skill level 2. To reach skill level 3 and promotion to Staff Sergeant the soldier must attend the Advanced Leader Course, which has replaced the Basic Noncommissioned Officer Course. The Advanced Leader Course prepares the soldier for Quality Assurance and Quality Control for the aviation platform of a specific MOS. Skill Level 4 is for Senior Leaders that can work across multiple aviation platforms. Should an individual desire to cross-train into a new MOS as a skill level 3 one must attend AIT or the new MOS and retrain. The duplication of effort will result in courses the maintainer is already familiar with such as, training on reading technical manuals, schematics, and drawings. Learn to follow technical manuals in removing and replacing aircraft components. Additional training provides troubleshooting and repair of hydraulic, fuel and electrical systems, sheet metal repair, tools and aviation ground support equipment. The basic skills are taught for each MOS at AIT and the amount of time to retrain is a

burden on the unit and for the soldier may limit promotion potential until all training and on-the-job training is completed for the new MOS, as long as 24 months. New doctrine changes in the DOTMLPF-P to support Multi-Domain Operations will consist of aviation units in fewer numbers with broader range of aviation platforms and less depth. “We're going to have soldiers, officers, warrant officers that are operating independently in remote locations that have to come together at a certain point in time to provide an effect," (Morris, 2019, p. paragraph 5). A need exists for the Army to be more agile in the support of aviation maintenance training to support MDO and Army modernization.

The next level in Aviation Maintenance Training would be that of an Inspection Authorization (IA) certificate holder which means the individual possesses the skills knowledge and abilities to oversee aviation maintenance practices on any given aviation platform. This takes time for training and certification and is comparable to Army’s Advanced Leader or Senior Leader’s course.

> The senior maintainer course provides US Army aviation maintenance managers detailed technical knowledge to understand applied mechanical principles and practices. The course material is specifically designed to demonstrate the relationships between different levels of aircraft/aerospace technical data and the corresponding levels of maintenance practices and procedures. (Department of the Army, 2018a, pp. B-3)

In comparison to the FAA IA certification, the IA can work across multiple aerial platforms, where the senior maintenance technicians can Technically Inspect (TI) aircraft, which is part of the MOS. For the senior maintenance technician to cross multiple aviation platforms one must attend AIT for the specific aircraft, which includes general aviation practices, and resurfaces as a skill level 1. Upon completion of on-hands-maintenance or on-the-job-training

can progress to a skill level 2 or 3. This reclassification can improve the amount of aviation maintenance technicians required to support MDO with limited personnel, however, promotion opportunities is the maintainers' detriment until one achieves the skill level commensurate with rank. "We know we're going to have to modify leader development because the training model that has produced the best (counterinsurgency) Army in the world is not going to get it for MDO 2028" (Morris, 2019, p. 5). This type of approach does little for self-development or support an agile ready maintainer. In 1980, the Deputy Chief of Staff for the U.S. Army G4 commissioned an Army Aviation Maintenance Career Management Field 67 Study. Since this study Career Management Field 67 has changed to 15 and the focus was Aviation Force Structure, Personnel Management, Aviation Maintenance Training, and Army Aviation Maintenance. The face of war has changed rapidly and technologically in the forty years that have passed.

Conclusion and Recommendations

Conclusions

This research is to understand the changing dynamics in modernization and rapid fielding requirements in the National Defense and Army Modernization strategies. The changes in modernization and rapid fielding create opportunities for optimization in the aviation maintenance training. To be more agile and versatile to meet the needs of MDO and modernization plans aviation MOS's must change and adapt. The Army Modernization Strategy Framework identifies the means and ways to reach the desired end-state. Rapid capability fielding can and has been demonstrated to work. However, rapid capability fielding is in conflict with the NDS to reduce the need for commercial sustainment and maintenance support. To achieve this end state in aviation maintenance requires an aviation mechanic that is proficient in general aviation techniques, has experience with multiple aerial platforms, and is sound on aviation maintenance theory. Delivering a new capability to field units requires NET, which is two weeks to four months in duration depending on the complexity. However, NET training is more than just maintenance training including the full operational spectrum for a combat unit. NET training plans are sufficient to train aviation mechanics to sustain an aerial platform. The time required for aviation maintenance technician to progress through AIT is between 13 – 23 weeks depending on the MOS compared to a commercial, FAA approved, aviation school curriculum between 12 and 24 months. There is a need to realign aviation maintenance training for the future to support MDO and Army modernization.

The three ways to obtain an FAA A&P license are consistent with the combination of training and on-the-job-training (OJT) requirements in the aviation MOS. A commercial air carrier or Maintenance, Repair, Overhaul operation leverage newly licensed A&P mechanics that

underwent training and testing on general aviation tasks and maintenance theory. This is consistent with the Army standard of attending AIT and graduating as skill level 1 and then putting in the time with OJT to achieve a skill level 2. The difference is the newly graduated aviation mechanic can only work on the aircraft based on one's MOS. Whereas A&P mechanics can work on any aerial platform under the supervision of licensed Inspector Authorization certificate holder.

The addition of MDO further complicates the challenges of personnel. An example is an Aviation Flight Support Battalion may no longer deploy in total, but may only take a mix of aircraft within the battalion to join other combat units. If three different types of aircraft deploy e.g. UH-60, CH-47, and AH-64, this would require personnel to maintain each aircraft system, which increases the number of personnel to support deployment operations instead of an aviation unit that is capable of performing maintenance on all aircraft.

The next area for consideration leads to Senior Leader development in aviation maintenance. The training and reclassification structure should be assessed for feasibility to allow Senior Leader aviation mechanics to attend an AIT for unique aerial platform differences as either a Skill Identifier (SI) or a Special Qualification Identifier (SQI) to certify the maintenance of different aerial platforms, which would create a more adaptable and ready aviation unit. To achieve this efficiently, aviation AIT would need to break out general aviation tasks and procedures, separate from the unique differences with each aerial platform, which could shorten the time associated with attending AIT for the purposes of garnering additional airframe training. The use of SI and SQI would not jeopardize the Senior Leader's skill level and hinder one from promotion opportunity. In fact, the more SI's and SQI's could create a larger promotion opportunity in the aviation maintenance career field.

In summary, the information in this research is to identify answers and information on three questions that contribute to the problem statement. Optimization could be met through consolidation of Aviation Maintenance Military Occupational Specialties that enables maintainers to perform tasks on multiple variants of aircraft. The aviation maintenance structure has opportunity to follow the pattern of the FAA A&P process of training general aviation skills and theory creating a general aviation mechanic, one then continues training into a specific airframe specialty. Modification of AIT can benefit aviation maintenance by creating a separate AIT for general skills, theory, documentation, aviation ground support equipment, and safety standards then proceed to AIT for unique aerial platforms. The development of a Synthetic Training Environment can provide follow-on training at the organizational level as well as self-development training.

Recommendations

Recommendation 1: Introduce consolidation of Aviation Maintenance Technicians during the experimentation and analysis phase and assess training requirements during FY2020 and FY2022 MDO concept testing. Where possible leverage FAA general aviation practices in the analysis to ensure the most effective and efficient use of aviation mechanics. Consider arranging courses to allow for optimum training experiences. Create an AIT for basic and general aviation tasks that include required training for the ordering of materials and supplies, the translation and use of technical manuals drawings and schematics and general theory airframe structures, propulsion, electrical and avionics. Create, improve, or realign AIT for specific MOS and aerial platforms to teach and educate on the unique differences of the aircraft and critical tasks as identified by aviation units for proficiency while decreasing the length of time for training.

Recommendation 2: Develop distributed computer based training videos, maintenance training aids, and Synthetic Training Environments for aviation maintenance training. The additional training devices will enable skill development at a pace consistent with emerging technological changes and new capabilities.

Recommendation 3: Create AIT courses with respect to the new aviation materiel introduced into the inventory. Use contractor developed NET Plans for incorporation into an AIT courses. Continue to follow-up for inclusion of Critical Tasks into Training and shorten the time from new fielding to institutional training.

Recommendation 4: Conduct a study on the Army Aviation Maintenance MOS 15 series. Identify opportunities for consolidation of MOS career fields to improve the introduction of new aerial weapon systems into the inventory. Create opportunities for promotions and skill level enhancement that fosters unique tactical formations in consideration of MDO's.

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Acronyms

AFSB	Army Field Support Battalion
AH	Attach Helicopter
AIT	Advanced Individual Training
ALC	Advanced Leaders Course
AMS	Army Modernization Strategy
AMT	Aviation Maintenance Technician
AMTP	Aviation Maintenance Training Program
AOC	Area of Concentration
APD	Army Publication Directorate
AR	Army Regulation
ARFORGEN	Army Force Generation
ASI	Additional Skill Identifier
CFR	Code of Federal Regulations
CFT	Cross-Functional Teams
CH	Cargo Helicopter
DA	Department of the Army
DAC	Department of the Army Civilian
DAU	Defense Acquisition University
DOTMLPF-P	Doctrine, Organizations, Training, Materiel, Leader development and education, Personnel, Facilities, and Policy
DTIC	Defense Technical Information Center
DTT	Doctrine and Tactics Training
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FSDO	Flight Standards District Office
FY	Fiscal Year
GED	General Education Diploma
IA	Inspector Authorization
ICAO	International Civil Aviation Organization
ICTL	Individual Critical Task List
IW	Irregular Warfare
JCIDS	Joint Capabilities Integration and Development System
JFC	Joint Force Commander
LIC	Language Identification Code
MATDEV	Materiel Developer
MDO	Multi-Domain Operations
MOS	Military Occupational Specialty

NDS	National Defense Strategy
NET	New Equipment Training
NSS	National Security Strategy
OJT	On the Job Training
OPSEC	Operations Security
PEO	Program Executive Office
PM	Program Manager
PME	Professional Military Education
QC	Quality Control
SI	Skill Identifier
SQI	Special Qualification Identifier
SSCF	Senior Service College Fellowship
STE	Synthetic Training Environment
TBD	To Be Determined
TC	Training Circular
TI	Technical Inspector
TNGDEV	Training Developer
TRADOC	U.S. Army Training and Doctrine Command
UAS	Unmanned Aircraft Systems
UH	Utility Helicopter
USAACE	U.S. Army Aviation Center of Excellence
WALC	Worldwide Aviation Logistics Conference
WO	Warrant Officer

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