Strike Swiftly: Developing Sustainable Maintenance Strategy in Combined Arms Battalion

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The mission of the combined arms battalion (CAB) is to close with and destroy enemy forces using fire, maneuver, and shock effect or to repel their assault by fire and counterattack (Army Techniques Publication 3-90.5, **Combined Arms Battalion**). Although this is the singular mission of the CAB, the demands and requirements put on the organization are great, and personnel challenges [both military occupational specialty (MOS) and experience shortages] exacerbate the ability to effectively meet mission. While the Regionally Aligned Readiness and Modernization Model (ReARMM) provides a framework with clear delineation between train, modernization, and mission windows, in practice, there is overlap where mission sets bleed into each other creating great demand on battalion formations. Given this environment, it is paramount that leaders provide a clear and detailed vision that prioritizes and manages both training and maintenance lines of effort, while clearly articulating areas where risk can be assumed.

There are many ways to approach this problem set. The purpose of this paper is to convey a way to define the CAB fight, develop a framework to guide the maintenance enterprise, and provide recommendations to equip battalions in executing their mission set.

Defining CAB fight

It is commonly said that maintenance builds lethality. In a constrained environment, it is more apropos to state that lethality requirements drive maintenance. It is the responsibility of the Battalion Commander to clearly define what lethality means to the formation. The following utilizes an approach used by the 2nd Battalion, 70th Armor Regiment, 2nd Armored Brigade Combat Team (ABCT), 1st Infantry Division. The overachieving goal of the 2-70 Armor is the following: **Thunder Battalion coordinates and synchronizes warfighting functions to mass two companies at the decisive point.**

It is a singular statement that guides all battalion efforts. The commander is responsible to define this guidance based on a clear and defined construct. The CAB construct can be broken down to the following:
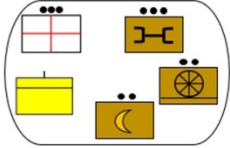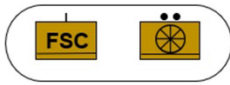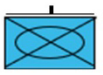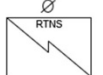
CAB Elements		CAB Command Nodes	
Scout Platoon (PLT)		Tactical Operations Center	TOC
Sniper Section		Tactical Command Post	TAC
Mortar PLT		Combat Trains Command Post - Distro Section - HHC HQ - Field Feeding - Unit Maintenance Control Point (UMCP) - Battalion Aid Station (BAS)	
Tank Company (x2)			
Mechanized Infantry Company			
Retrans		Field Trains Command Post - FSC HQ - Distro Section - HHC Elements	FSC

Figure 1. Identification of CAB elements and command nodes. *(U.S. Army)*

For each of these elements, the lethality capability requirements can be summarized as the following.

Scout PLT Capability	TOC Capability
Recon & Security: 3xSections	Control OPs
Observe NAIs / Anticipate BN Decisions / Report	Plan Future OPs
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL	Report Flow
	Fight ISR
Soak Up Enemy Combat Power	Sync Sustainment
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature	Fight Fires
	Role 1: Triage, Treat, Evac
Sniper Section Capability	**TAC Capability**
Long range precision fires	Control Specific Operation
Answer CDR PIR	Control Fight (TOC Jump)
Surveillance and Observation	Facilitate Timely Decision Making
Mortar PLT Capability	**CTCP Capability**
Suppress / Disrupt the Enemy: 2xSections	Serve as Alt CP
	Manage A&L Net
Retrans Capability	Maintenance Collection Point - Repair + Evac
Retransmit Comms	Controls Sustainment Traffic
Tank CO Capability	Runs 2xLRPs Daily
Close-in with and Destroy the Enemy / Seize Terrain	Resupply Scouts and Mortars
	Personnel Services
Command and Control	**FTCP Capability**
Call for Fire	Coordinate Log w/ BSB
Logistic Release Point Ops	Configure LOGPAC
EVAC (personnel & platforms)	Coord Replacements
MECH IN CO Capability	Legal Services
Close-in with and Destroy the Enemy / Seize Terrain	Postal Services
	Coord Evac of Equipment and Personnel
Clear the High Ground	
Command and Control	
Call for Fire	
Logistic Release Point Ops	
EVAC (personnel & platforms)	

Table 1. List of capability requirements. *(U.S. Army)*

Having listed all the required lethality capabilities, it is important to clearly describe the equipment/platform needed to meet each capability. This category, which is called the Fight category, is the baseline of equipment / platforms needed to deliver the requirement. Although based on the modified tables and organization equipment, the number requirements are based on a realistic evaluation of the fleet. Leaders who expect every piece of equipment and platform to be fully mission capable are detached from reality or are being lied to. Using the Scout PLT as an example, here is the baseline list of equipment / platforms needed to deliver the capability:

Scout PLT Capability	Equipment / Platform
Recon & Security: 3xSections	M2A3: 2
Observe NAIs / Anticipate BN Decisions / Report	JLTV: 4 LRAS: 1x per section
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL	Raven: 1 LRAS: 1x per section Raven: 1
Soak Up Enemy Combat Power	JBCP: 1xper section
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature	

Table 2. Scout capability and equipment/platform requirements. *(U.S. Army)*

The following is the full list:

Scout PLT Capability	Equipment / Platform
Recon & Security: 3xSections	M2A3: 2
Observe NAIs / Anticipate BN Decisions / Report	JLTV: 4
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL	LRAS: 1x per section
Soak Up Enemy Combat Power	Raven: 1
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature	LRAS: 1x per section
	Raven: 1
	JBCP: 1xper section

Sniper Section Capability	Equipment / Platform
Long range precision fires	Sniper Section
Answer CDR PIR	3xPSR
Surveillance and Observation	9xSDMR

Mortar PLT Capability	Equipment / Platform
Suppress / Disrupt the Enemy: 2xSections	M1064A3: 4
	M577A3: 1
	Gun Tubes: 4
	Bipods: 4

Retrans Capability	Equipment / Platform
Retransmit Comms	JLTV & JBCP

Tank CO Capability	Equipment / Platform
Close-in with and Destroy the Enemy / Seize Terrain	M1A2: 10 (3 M1A2 x 3 PLTs; 1xC2)
Command and Control	JBCP: 1xPLT ; 1xC2
	FIST: 1
Call for Fire	LMTV: 1
	M113: 1
	M88: 1
	CNT TRK: 1
Logistic Release Point Ops	BOH: 1
	Plow: 2
EVAC (personnel & platforms)	Roller: 1

MECH IN CO Capability	Equipment / Platform
Close-in with and Destroy the Enemy / Seize Terrain	M2A3: 10
Clear the High Ground	JBCP: 1xPLT ; 1xC2
Command and Control	FIST: 1
Call for Fire	LMTV: 1
	3x SQDs per PLT (2x Rifle and 1x WPNS SQD)
Logistic Release Point Ops	M88: 1
EVAC (personnel & platforms)	M113: 1

TOC Capability	Equipment (How)
Control OPs	JBCP: 2
	FM: 6
Plan Future OPs	STT: 1
	OSVRT: 1
Report Flow	JLTV + Trailer: 1
	1068: 1
Fight ISR	GBD: 1
	CD1: 1
Sync Sustainment	JLTV: 1
	1068: 1
Fight Fires	AFATDS: 1
	FM (Fires): 1

TAC Capability	Equipment (How)
Control Specific Operation	M1A2: 1
Control Fight (TOC Jump)	M2A3: 1
	JLTV: 2
Facilitate Timely Decision Making	JBCP: 2

CTCP Capability	Equipment (How)
Serve as Alt CP	JLTV (JBCP/FM): 1
	JLTV (JBCP/FM): 1
	LMTV + Trailer: 1
Manage A&L Net	1068 (JBCP/FM): 1
	Shop Van: 1
	Expando Van: 1
	VSAT: 1
Maintenance Collection Point - Repair + Evac	88s: 1
	Wrecker: 1
	FRS: 1
Controls Sustainment Traffic	SAT: 1
	LMTV: 1
	BOH: 5
	Maint Enc: 1
Runs 2xLRPs Daily	Gen: 1
	Flat Racks: 2
	LHS/Trailer: 3
Resupply Scouts and Mortars	JBCP: 1
	FM: 1
	Fuelers/TRM: 2
Personnel Services	JBCP: 1
	FM: 1
	Cache** (3 crops / LMTV+Trailer)
	LMTV + Trailer: 1

FTCP Capability	Equipment (How)
Coordinate Log w/ BSB	JLTV: 1
Configure LOGPAC	JBCP: 1
Coord Replacements	FM: 2
Legal Services	LHS/Trailer: (3)
Postal Services	(1) JBCP/(1)FM
Coord Evac of Equipment and Personnel	Fuelers/TRM: (2)
	(1) JBCP/(1) FM

Table 3. Consolidated list of capability and equipment/platform requirements. *(U.S. Army)*

The overall vision is encompassed in the following compilation of the figures above.
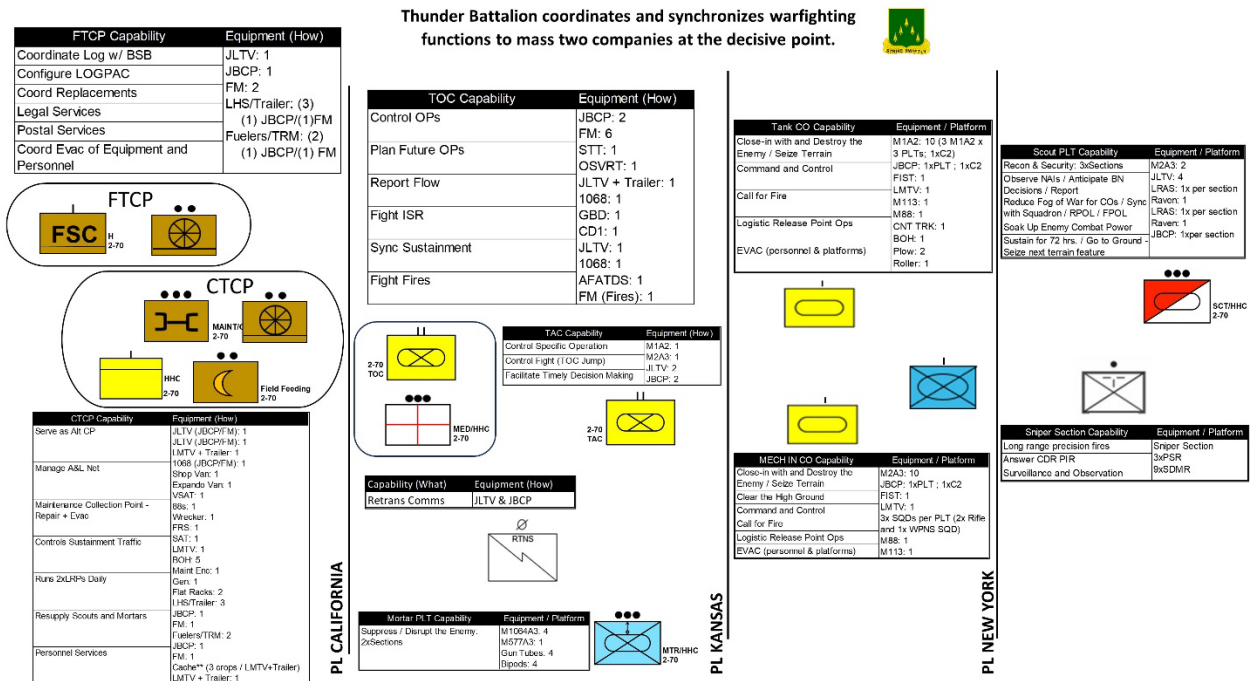
Thunder Battalion coordinates and synchronizes warfighting functions to mass two companies at the decisive point.

FTCP Capability	Equipment (How)
Coordinate Log w/ BSB	JLTV: 1
Configure LOGPAC	JBCP: 1
Coord Replacements	FM: 2
Legal Services	LHS/Trailer: (3) (1) JBCP/(1)FM
Postal Services	Fuelers/TRM: (2) (1) JBCP/(1) FM
Coord Evac of Equipment and Personnel	

FTCP — FSC H 2-70

CTCP — MAINT 2-70, HHC 2-70, Field Feeding 2-70

CTCP Capability	Equipment (How)
Serve as Alt CP	JLTV (JBCP/FM): 1
	JLTV (JBCP/FM): 1
	LMTV + Trailer: 1
Manage A&L Net	1068 (JBCP/FM): 1
	Shop Van: 1
	Expando Van: 1
	VSAT: 1
Maintenance Collection Point - Repair + Evac	88s: 1
	Wrecker: 1
	FRS: 1
Controls Sustainment Traffic	SAT: 1
	LMTV: 1
	ROH: 5
	Maint Enc: 1
Runs 2xLRPs Daily	Gen: 1
	Flat Racks: 2
	LHS/Trailer: 3
Resupply Scouts and Mortars	JBCP: 1
	FM: 1
	Fuelers/TRM: 2
	JBCP: 1
Personnel Services	FM: 1
	Cache** (3 crops / LMTV+Trailer)
	LMTV + Trailer: 1

TOC Capability	Equipment (How)
Control OPs	JBCP: 2
	FM: 6
Plan Future OPs	STT: 1
	OSVRT: 1
Report Flow	JLTV + Trailer: 1
	1068: 1
Fight ISR	GBD: 1
	CD1: 1
Sync Sustainment	JLTV: 1
	1068: 1
Fight Fires	AFATDS: 1
	FM (Fires): 1

2-70 TOC — MED/HHC 2-70

TAC Capability	Equipment (How)
Control Specific Operation	M1A2: 1
Control Fight (TOC Jump)	M2A3: 1
Facilitate Timely Decision Making	JLTV: 2
	JBCP: 2

2-70 TAC

Capability (What)	Equipment (How)
Retrans Comms	JLTV & JBCP

RTNS

Mortar PLT Capability	Equipment / Platform
Suppress / Disrupt the Enemy. 2xSections	M1064A3: 4
	M577A3: 1
	Gun Tubes: 4
	Bipods: 4

MTR/HHC 2-70

Tank CO Capability	Equipment / Platform
Close-in with and Destroy the Enemy / Seize Terrain	M1A2: 10 (3 M1A2 x 3 PLTs; 1xC2)
Command and Control	JBCP: 1xPLT ; 1xC2
Call for Fire	FIST: 1
	LMTV: 1
Logistic Release Point Ops	M113: 1
	M88: 1
	CNT TRK: 1
EVAC (personnel & platforms)	BOH: 1
	Plow: 2
	Roller: 1

MECH IN CO Capability	Equipment / Platform
Close-in with and Destroy the Enemy / Seize Terrain	M2A3: 10
Clear the High Ground	JBCP: 1xPLT ; 1xC2
Command and Control	FIST: 1
Call for Fire	LMTV: 1
Logistic Release Point Ops	3x SQDs per PLT (2x Rifle and 1x WPNS SQD)
EVAC (personnel & platforms)	M88: 1
	M113: 1

Scout PLT Capability	Equipment / Platform
Recon & Security: 3xSections	M2A3: 2
Observe NAIs / Anticipate BN Decisions / Report	JLTV: 4
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL	LRAS: 1x per section
Soak Up Enemy Combat Power	Raven: 1
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature	LRAS: 1x per section
	Raven: 1
	JBCP: 1xper section

SCT/HHC 2-70

Sniper Section Capability	Equipment / Platform
Long range precision fires	Sniper Section
Answer CDR PIR	3xPSR
Surveillance and Observation	9xSDMR

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Figure 2. The Thunder Fight: Capability and equipment/platform requirements by element and command node. *(U.S. Army)*

This single framework (Figure 2. The Thunder Fight) focuses the battalion on both training and maintenance lines of effort. Each formation at echelon has a clear idea of how it fits into the overall fight and the equipment/platforms required to deliver their capabilities. The next logical step is to take the fight equipment/platform requirements and compare them to the current mission capable status of those items.

Tank Company							
Item	**O/H**	**Fight**	**A CO**	**Status**	**B CO**	**Status**	**Manned**
M1A2	14	10	8	[red]	11		Y
JBCP	16	4	0	[red]	0	[red]	[X]
FIST	2	1	1		1		Y
LMTV	2	1	1		1		Y
M113	2	1	1		1		N [red]
M88	2	1	0	[red]	0		Y
Contact TRK	2	1	1		1		N [red]
BOH	2	1	1		1		[X]
Plow	6	2	0	[red]	0	[red]	[X]
Roller	2	1	0	[red]	0	[red]	[X]

Table 4. Tank company maintenance and personnel readiness status. *(U.S. Army)*

The O/H column is based off the modified table of organization and equipment list, the Fight column is the requirement defined by the battalion commander, and the company column is the current slant of the item. If the

company fully mission capable (FMC) equals or is greater than the Fight column, the status box remains blank. If the company FMC is less than the Fight column, the status box turns red. The final column Manned encompasses personnel readiness. It is a seemingly innocuous column but one that conveys significant information. If the platform is manned (denoted by Y), it means that the crew is deployable, qualified and meets all rank requirements (particularly if an NCO vehicle commander is required). If a platform is not manned due to personnel shortages, the team can assume risk and not devote maintenance energy to that platform or request support from higher.

Once done throughout each element and command node, the gaps in readiness (maintenance + personnel) become readily clear. This provides the battalion a clear snapshot of where their maintenance and personnel readiness gaps exist based on lethality requirements. Leadership can then develop a maintenance strategy over time, applying the maintenance enterprise against a prioritized list. The battalion maintenance officer then coordinates with the S-3 Operations Shop and puts the maintenance strategy (unscheduled maintenance, services and leadership professional development) on the training calendar. This is a way to synchronize training and maintenance lines of effort based on required lethality capabilities. It is a holistic strategy to streamline efforts, provide clear guidance and prioritization, and identify areas where the battalion can assume risk. The overall assessment maintenance and personnel readiness status is captured as follows:

FTCP

Item	O/H	Fight	Current	Status	Manned
JLTV	2	1	1		Y
JBCP	1	1	0	red	X
FM	2	2	1	red	X
LMTV	1	1	1		Y
LHS/Trailer	4	3	3		Y
JBCP	3	1	0	red	X
FM	4	1	2		X
Fuelers/TRM	3	2	2		Y
JBCP	3	1	0	red	X
FM	3	1	2		X

CTCP

Item	O/H	Fight	Current	Status	Manned
C2					
JLTV (HHC)	2	2	2		Y
JBCP	2	1	0	red	X
FM	2	2	2		X
S1					
LMTV + Trailer	1	1	1		Y
S4					
1068	1	1	0	red	Y
JBCP	1	1	0	red	X
FM	1	1	1		X
UMCP					
Shop Van	1	1	1		Y
Expando Van	1	1	1		Y
VSAT	1	1	1		X
M88	1	1	1		Y
Wrecker	1	1	1		Y
FRS	1	1	1		X
SAT	1	1	1		Y
LMTV	1	1	1		Y
BOH	5	5	5		X
Maint Enc	1	1	1		Y
Gen	1	1	1		X
Flat Racks	2	2	2		X
Distro Section					
LHS + Trailer	3	3	3	red	N
JBCP	1	1	0	red	X
FM	1	1	1		X
Fueler + TRM	3	2	2	red	N
JBCP	1	1	0	red	X
FM	1	1	1		X
Crops	3	3	3		X
LMTV + Trailer	1	1	1		Y

TOC

Item	O/H	Fight	Current	Status	Manned
JBCP	2	2	1	red	X
FM	6	6	6		X
STT	1	1	0	red	X
OSRVT	5	1	1		X
JTLV + Trailer	1	1	1		Y
1068	2	1	1		Y
GBD	1	1	1		X
CD1	2	1	1		X
JLTV	1	1	1		Y
1068 w/	1	1	1		Y
AFATDS	1	1	1		X
FM	1	1	1		X
M113 (Medics)	6	3	1	red	N
LMTV	1	1	1		Y
DRASH	1	1	1		X
Generator	1	1	0	red	X
577 w/ APU	1	1	0		Y
JLTV 2/ JBCP	1	1	1		Y

TAC

Item	O/H	Fight	Current	Status	Manned
M1A2	1	1	1		N
M2A3	1	1	1		Y
JLTV w/	2	2	2		Y
JBCP	4	2	0	red	X

RETRANS

Item	O/H	Fight	Current	Status	Manned
JLTV w/	1	1	1		Y
JBCP	1	1	0	red	X

FAS

Item	O/H	Fight	Current	Status	Manned
1068 w/		1		red	N
JBCP		1		red	X
FM		1		red	X

MORTARS

Item	O/H	Fight	Current	Status	Manned
M1064A3	4	4	1		Y
M577A3	1	1	0	red	Y
Gun Tubes	4	4	4		X
Bipods	4	4	0	red	X

Tank Company

Item	O/H	Fight	A CO	Status	B CO	Status	Manned
M1A2	14	10	8	red	11	red	Y
JBCP	16	4	0	red	0	red	X
FIST	2	1	1		1		Y
LMTV	2	1	1		1		Y
M113	2	1	1		1		N
M88	2	1	0	red	0	red	Y
Contact TRK	2	1	1		1		N
BOH	2	1	1		1		X
Plow	6	2	0	red	0	red	X
Roller	2	1	0	red	0	red	X

Infantry Company

Item	O/H	Fight	Current	Status	Manned
M2A3	14	10	8	red	Y
JBCP	16	4	0	red	X
FIST	1	1	1		Y
LMTV	1	1	1		Y
M113	1	1	1		Y
M88	1	1	1		Y
Squads	9	3	1	red	N

Scout Platoon

Item	O/H	Fight	Current	Status	Manned
M2A3	3	2	3		Y
JLTV	5	4	5		N
LRAS	5	3	3		X
JBCP	8	3	0	red	X
Raven	2	1	0	red	X

Sniper Squad

Item	O/H	Fight	Current	Status	Manned
Sniper Section	1	1	0	red	N

Table 5. Consolidated list of maintenance and personnel readiness status by element and command node. *(U.S. Army)*

Based on this assessment, the battalion can clearly identify priorities and friction points, and the commander can provide Training Week (TW)+8 guidance. Furthermore, this dashboard (comprised of Figure 2 and Table 5) provides a tangible output (status update) for CAB meetings. The battalion training meeting must entail the development of capabilities required by the CAB to accomplish its mission while maintenance and personnel readiness (non-deployable scrubs, etc.) meetings must feed Table 5. Commanders are responsible, with input from their first sergeants and executive officers (XOs), to update the battalion commander on the dashboard. While this is a way to organize and assess capabilities and personnel, there are several doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) efforts that can better equip the CAB in building readiness.

Recommendations to support CAB maintenance operations

Even with clear guidance and a detailed maintenance strategy, CABs will continually face challenges in execution. Below are several DOTMLPF recommendations that would support and streamline maintenance operations.

Recommendation #1 (Organization/Personnel): Radio Equipment Repairers (MOS 94E) and Computer/Detection Systems Repairers (MOS 94F) Organic to the CAB.

Due to the sheer amount and complexity of communication systems and equipment, it would benefit the CAB to have one NCO and two 10-level Soldiers organic to the CAB for internal communication and electronics (C&E) and electronic maintenance (ELM) repairs. Currently, all night vision devices and communication devices are evacuated to the brigade support battalion for repair/service. Centralized repair naturally creates a backlog, which prioritizes units executing training for repairs. This inhibits units preparing for training to conduct proper repairs and services prior to execution. Having organic C&E and ELM capabilities will decrease overall turnaround time, create shop stock for common repairs, and provide flexibility in garrison/field environments to build equipment readiness.

Recommendation #2 (Education): Training Deficiencies for MOS 91F (M242 25mm) and MOS 91A (M1 Abrams Schematics).

Small Arms Repairers (MOS 91F) and Tank Mechanics (MOS 91A) do not receive sufficient training through Army schools to prepare them for operations. The 91F is responsible for servicing the M242 25mm Bushmaster. They do not receive adequate training during advanced individual training (AIT) to properly service and repair the weapon system. While master gunners are present to assist in repairs and services, they are only capable of executing 10/20 level tasks and repairs. The 91F is responsible for 30 level tasks, but they are not provided the education needed to complete these repairs. The Army must increase training time during AIT for 91F Soldiers, so they are equipped to execute repairs once they get to their unit. An alternate solution is to make the repair/services of the M242 a critical task for Bradley mechanics (MOS 91M).

91A Soldiers must receive tank schematic training during AIT. This is increasingly significant as the CAB fights through personnel challenges and many mechanics fulfill positions of greater responsibility than their rank. In a CAB, junior 91As frequently are faced with tank schematic faults. There is a knowledge deficiency in tank schematics for junior 91A Soldiers. These tank mechanics do not receive training on tank schematics until the Advanced Leader Course. Tank mechanics, like their Bradley mechanic counterparts, should receive training on schematics during AIT.

The Maintenance Process and Friction Points. Soldiers conduct preventative maintenance checks and services (PMCS) and manually annotate faults on a Form 5988. Mechanics, with a senior mechanic and team chief, then verify the faults and either dismiss (wrong annotation), repair, or request parts to be ordered. Once this process is complete, the equipment records parts specialist (ERPS) clerk manually inputs this information into Global Combat Support System – Army (GCSS-Army). There are two points of friction in this process. The first is the transition from a manual process (Form 5988) to a digital process (manual input of the 5988 information by the ERPS clerk into GCSS-Army) and the second is the manual search of parts by National Item Identification Number (NIIN). To alleviate these frictions points, the following recommendations are presented.

Recommendation #3 (Material): Digital 5988: The amount of error that exists in the current manual process can be reduced through a digitized system. Additionally, the workload for clerks to manually input 5988 information into GCSS-Army can also be reduced. A software application with a simple user interface that can be accessed by all users is advantageous. Table 6 below annotates the use case and functional requirement for this software application.

USER	STEP	USER ACTION	FUNCTIONAL REQUIREMENTS	NON-FUNCTIONAL REQUIREMENT
Soldier	1A	Soldier indicates that they would like to begin the PMCS process	System provides an application that serves as the primary user interace	System application must be accessible off of Soldier's device through Army Mobile Connect
	1B	Soldier selects the type of user, selects the Bumper Number of the platform/equipment on which they will be conducting the PMCS and selects the type of PMCS they will be conducting (before, during, after, weekly, monthly)	o System provides a list of user type from which an individual can select: Soldier, Maintainer, or Enterprise User o System provides a list of bumper numbers or equipment identifying feature which the Soldier can select from; search function provided; filterable function provided o Based on bumper number, system provides the PMCS checklist for that piece of equipment o Based on Soldier selection, system provides PMCS checklist for before, during, after, weekly, or monthly	
	1C	Soldier conducts PMCS checks line by line; if fault is found, Soldier indicates the fault	o System provides a method to indicate faults; for each PMCS line, the "Equipment Not Ready / Available If:" statement is available to click if true; If soldier clicks, it annotates the fault on the Digital 5988 o As faults are selected, the System saves them to a Digital 5988 that consolidates all faults during the PMCS process	
	1D	Once complete, Soldier views the consolidated faults on a Digital 5988 and sends forward	o System provides a Digital 5988, with consolidated faults, for the Soldier to review o Once reviewed, the Soldier confirms completion and sends Digital 5988 forward o Once complete, System alerts the maintenance enterprise that a Digital 5988 is ready for verification	
Maintainer	2A	Maintainer indicates that they would like to verify the Digital 5988	System provides an application that serves as the primary user interace	System application must be accessible off of Maintainer's device through Army Mobile Connect
	2B	Maintainer selects their user type and selects the Bumper Number of the platform/equipment on which they will be conducting the PMCS	o System provides a list of user type from which an individual can select: "Soldier," "Maintainer," or "Enterprise" o System provides a list of Bumper Numbers from which the maintainer can choose from; search function provided; filterable function provided	
	2C	Maintenance Soldier verifies the fault on the Digital 5988: Dismiss, Repairs Fault, or Requests Order of Parts.	o System provides a method to indicate verification of faults: o Dismiss = System provides option for maintainer to dismiss fault (wrongful entry by Soldier) o Repair = System provides option for maintainer to confirm repair of fault o Request Order of Parts = System provides option for maintainer to request for the order of parts o System provides NIIN Recommendation (based on item type) o System provides NIIN search option (searches EMS NG, IADS, and AESIP TMs)	
	2D	Once complete, Maintainer views the consolidated verified faults and parts request on a Digital 5988 and sends forward	o System displays the Digital 5988, with verified faults and parts request, for the maintainer to review o Once reviewed, the Maintainer confirms completion and sends Digital 5988 forward o Once complete, System alerts the Enterprise that a Digital 5988 has been verified	
Enterprise User (Senior Mechanic, Team Chief, ERPS Clerk, Maint Tech, MCS, MCO, BMO)	3A	Enterprise indicates that they would like to view the verified Digital 5988	System provides an application that serves as the primary user interace	System application must be accessible off of Enterprise's device through Army Mobile Connect
		Enterprise selects their user type and selects the Bumper Number of the platform/equipment on which they will view the Digital 5988	o System provides a list of user type from which an individual can select: "Soldier," "Maintainer," or "Enterprise User" o System provides a list of Bumper Numbers from which the Enterprise can choose from; search function provided; filterable function provided	
		Enterprise views the verified faults on the Digital 5988, confirms the parts request, and places parts on order	o System displays the Digital 5988, with verified faults and parts request, for the Enterprise User to review o System provides ability for enterprise user to edit verification options: Dismiss, Repair, Parts Requested o System provides ability for enterprise user to confirm parts request and place order	

Table 6. Use Case and Functional Requirements for Digital 5988 Software. *(U.S. Army)*

Recommendation #4 (Material): Artificial Intelligence Chatbot for NIIN Search
The current process to find correct NIINs for parts is inefficient and desynchronized. Currently, users have three disparate and delinked locations to look for NIINs: Electronic Management System-Next Generation; technical manuals through the Army Enterprise System Integration Program; and Interactive Authoring and Display Software. Additionally, there are numerous NIINs for similar parts or like items which induces error. It is not uncommon for a unit to receive a part only to find that it is the wrong item. An artificial intelligence (AI) Chatbot that an enterprise user can interact with to search through all three systems simultaneously would save inordinate amounts of time and reduce human error. The advent of AI software that can assist in the creation of datasets, train AI, and automate workflows, makes this a reasonable endeavor. Companies like Palm AI through their Endobyte Software

as a Service allows users to customize datasets, execute AI training and implement AI Chatbots. Below is the use case and functional requirements for this software.

USER	STEP	USER ACTION	FUNCTIONAL REQUIREMENTS	NON-FUNCTIONAL REQUIREMENT
Enterprise User	1A	User indicates that they would like to search for a NIIN	System provides an application that serves as the primary user interace	System application must be accessible off of User's device through Army Mobile Connect
	1B	User inputs their desired part in the chat	o System identifies the requested part o System requests any clarification or additional information needed to identify specific part o System searches for the NIIN	
	1C	User inputs any additional questions to confirm the part is correct	o System provides clarification of why NIIN is correct o System provides options of different NIINs to clarify correct part	
	1D	Once complete, user reviews the NIIN , confirms correct part, and sends forward to Digital 5988	o System provides final NIIN for part in question o Once confirmed, System sends NIIN from chat box to Digital 5988	

Table 7. Use Case and Functional Requirements for AI Chatbot NIIN Search Software. *(U.S. Army)*

Conclusion

Combined arms battalions are faced with challenges as the Army modernizes and transforms during an inter-war period. In a time and resource constrained environment, it is imperative that the CAB commander provides a clear and detailed fighting strategy to coordinate and synchronize training and maintenance lines of efforts. By defining lethality at echelon, a CAB can prioritize maintenance requirements and develop a coherent strategy over time and space. The operational tempo for armored brigade combat teams has been significant and does not look to slow down. It is important that CAB leadership find efficiencies in the ReARMM framework to increase warfighting capabilities throughout the formation.

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Acronym Quick-Scan

ABCT – armored brigade combat team
AESIP – Army Enterprise Systems Integration Program
AFATDS – Advanced Field Artillery Tactical Data System
AFB – air force base
AI – artificial intelligence
AIT – advanced individual training
BAS – battalion aid station
BCT – brigade combat team
BMO – battalion maintenance officer
C&E – communication and electronics
CAB – combined arms battalion
CGSC – Command and General Staff College
CTCP – combat-trains command post
DOTMLPF – doctrine, organization, training, materiel, leadership and education, personnel, and facilities
DRASH – Deployable Rapid Assembly Shelter
ELM – electronic maintenance
EMS – Electronic Management System
ERPS – equipment records parts specialist
EVAC – evacuate
FiST – fire-support team
FMC – fully mission capable
FPOL – forward passage of lines
FSC – forward-support company
FTCP – field-trains command post
GCSS-Army – Global Combat Support System-Army
HHC – headquarters and headquarters company
JBC-P – Joint Battle Command-Platform
JLTV – Joint Light Tactical Vehicle
LMTV – Light Medium Tactical Vehicle
LOGPAC – logistics package
LRAS – Long-Range Acquisition System
MCO – maintenance control officer
MCS – mission-command system
MOS – military occupational specialty
NAI – named area of interest
NG – National Guard
NIIN – National Item Identification Number
OSRVT – One System Remote Video Terminal
PMCS – preventive-maintenance checks and services
PIR – priority intelligence requirement
ReARMM – Regionally Aligned Readiness and Modernization Model
RPOL – rearward passage of lines
RETRANS – retransmission
STT – Satellite Transportable Terminal
TAC – tactical command post
TOC – tactical operations center
TM – technical manual

UMCP – unit maintenance collection point
XO – executive officer