The United States Army Signal Corps Training Strategy

JULY 2018

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Headquarters, Department of the Army

Foreword

The U. S. Army can look back on the past seventeen years of war with pride and satisfaction in the missions we have accomplished. We have become experts at applying stability activities to support operations that occupy the low-intensity end of the range of conflict.

The nature of threats have evolved from Stability operations to Decisive Action in Large Scale Combat Operations. The Signal Corps is ready for the next fight; eager to move forward harnessing our experience while rapidly evolving to stay in step with the Warfighter. The Signal Corps will embrace flexibility, mobility, simplicity, and survivability that produces operational and network alignment. We take signal training and maintenance readiness serious because the mission depends on it.

Risks to our mission are proliferating. Cybersecurity threats, vulnerabilities in the electromagnetic spectrum, strategic dangers lurking in the information environment and throughout the human dimension. The Signal Corps is more than a network provider. Now more than ever we must innovate while keeping our networks secure with cybersecurity and electromagnetic protection embedded within all training. The equipment we employ is technically superior and is increasingly complex but our Soldiers will have greater intellect and operational mindset than ever before to overcome and master our craft.

I am fully confident that the Signal Corps will rise to this challenge. We have the advantage of recognizing the evolving risks to our missions and the courage to address them now — and we must address them now. If we wait to encounter the risks in combat, it will be too late. We will win tomorrow's wars by the way we train for them today.

This signal training strategy is the blueprint for that training. It provides mission-focused, outcomebased signal training guidelines to ensure Soldiers are equipped with the skills and confidence to win.

Since 1860, the United States Army Signal Corps has answered our nation's call to service and provided the communications necessary to win our nation's wars. By adapting our training for the future, we will continue to maintain the technical and intellectual superiority to win wars.

"PRO PATRIA VIGILANS"

Rel Elia

ROBERT L. EDMONSON II BRIGADIER GENERAL, UNITED STATES ARMY CHIEF OF SIGNAL

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The United States Army Signal Corps 2018 Training Strategy

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Preface

TC 6-02.1 provides training guidelines and strategies to develop and certify the proficiency of signal collective tasks in support of maneuver operations.

The principal audience for TC 6-02.1 is brigade combat team and brigade engineer battalion commanders, brigade and battalion signal staff, and signal company commanders. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this publication.

Commanders, staffs, and subordinates ensure that their decisions and actions comply with applicable United States, international, and in some cases host-nation laws and regulations. Commanders at all levels ensure that their Soldiers operate in accordance with the law of war and the rules of engagement. (See FM 27-10)

TC 6-02.1 applies to the Active Army, Army National Guard/Army National Guard of the United States and United States Army Reserve unless otherwise stated.

The proponent of TC 6-02.1 is the U.S. Army Cyber Center of Excellence. The preparing agency is the U.S. Army Signal School. Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, U.S. Army Cyber Center of Excellence and Fort Gordon, ATTN: ATZH-DT (TC 6-02.1), 506 Chamberlain Avenue, Fort Gordon, GA 3005-5735; by e-mail to usarmy.gordon.signal-schl.mbx.operations@mail.mil.

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Chapter 1 The Operational Challenge

OPERATIONAL CONTEXT

IMPLICATIONS OF THE FUTURE OPERATIONAL ENVIRONMENT

1-1. War is changing, and the U.S. Army must train for the changing character of war. The Army will frequently fight in **dense urban areas** in the next war. The Army will not enjoy unrestricted access to the electromagnetic spectrum, because civilian emitters will congest it and enemy forces will contest it. Mega cities and other man-made structures will interfere with line-of-sight communications. Enemy forces will use complex terrain to pose increased threats to force protection, even if they put innocent civilians at risk, and will blame any civilian casualties on the Army.

1-2. The enemy will have the ability to **contest the space domain**. The Army will not be able to depend on its constellation of communications satellites to provide constant connectivity in rough terrain. More alarmingly, the enemy could challenge the Army's positioning, navigation, and timing (PNT) satellites and interfere with encrypted communications throughout the force.

1-3. Advances in technology, ease of access, and reduced expenses have **lowered the barriers to entry** into warfare. In previous decades, adversaries had to develop expensive technologies, such as armor and artillery capabilities, to challenge the Army. In the next war, an adversary can have a direct impact on the mission with as little as a computer or a drone.

1-4. The Army must be prepared to fight a **peer threat** more so now than at any time since the end of the Cold War era. Army units can no longer operate with impunity on the battlefield; whatever the Army can do to its enemies, its enemies can do to the Army. The enemy will have precision strike capabilities to kill whatever it can sense. The Army must win the salvo competition and will require communications to do so—even though the electronic signature of communications systems invites enemy salvos.

1-5. The Army must become comfortable with radio silence. Units must relearn the art of **physical camouflage** while also learning how to conceal their electronic signatures and employ electronic protection (EP). Decoy electronic signatures will play an important role in military deception operations as they provide the noise in which genuine electronic signatures will hide. Units will rely on EP and relearn **emissions control**.

1-6. In contrast to the operational environment of the

Implications of the Future Operational Environment



- Dense Urban Areas
 - Congested/contested spectrum
 - Limited line-of-sight
 - Increased Force Protection threat
 - Risk to Civilians
- Contested Space Domain
 - Communications satellites at risk
 - Position, navigation, and timing
 - satellites at risk
- Low Barriers to Entry
 - Proliferation of cyber threats
 - Proliferation of drones
- Near-Peer/Peer Adversary
 - Symmetric capabilities
 - Area denial
 - Salvo competition
- Emissions Control/Physical Camouflage
 - Electronic countermeasures
 - Emissions control
 - Physical and electronic camouflage
 - $\circ~$ Signal role in military deception

Figure 1-1. Implications of Future OE

future, the Army lacks contemporary experience in operations against a peer threat. The Army is accustomed to enjoying unrestricted access to the

electromagnetic spectrum, technical overmatch, and large, static forward operating bases. These advantages served the Army well in the last war but they will likely not exist in the next war.

1-7. The Army took advantage of the information technology advancements of the last two decades and added numerous communications and computer systems to its arsenal, increasing its capabilities significantly in the size, weight, and power requirements of its command posts. The delineations in the responsibility for first line operators to run these systems and for signal Soldiers to integrate them are often blurred. To support these systems, the Signal Corps relies on a heavy suite of tactical networking equipment for which the end-of-life cycle has been determined but the replacement has not.

1-8. In the modular brigade combat team (BCT) organization, signal companies are organized under the brigade engineer battalion (BEB), as described in Appendix C. In garrison, this organization puts the burden for readiness oversight on a chain of command with limited experience in training signal units.

1-9. In the future operational environment, the character of war will be so different from the recent past that its lessons will be counterintuitive to the force. The technologies that will support mission command in this environment have yet to mature. The Army will build a ready force that is able to adapt to the challenges of the next war by integrating mission command and signal training into the unit training plan (UTP) with an effective strategy. See ADRP 7-0 for more information on unit training plans.

HOW SIGNAL TRAINING ENABLES SUCCESS

1-10. The Army will succeed despite the problems that the changing character of war poses. The solutions to these problems will come from materiel, doctrine, and training. This document focuses on training signal Soldiers, operators, and organizations to provide ready formations. **Training will serve as the bridge** from legacy to future equipment and doctrine.

1-11. **The right capability at the right level**. Cyberspace and the electromagnetic spectrum will be contested on battlefields of the next war. The Army will become comfortable with measured, sober communications plans. Commanders will expect their battalion or brigade signal staff officer (S-6) and signal units to provide the right level of communications support, rather than the maximum amount of communications possible. The S-6, collaborating with the battalion or brigade intelligence staff officer (S-2) and electronic warfare officer, will recognize and accept when the risk of emitting an electronic signature is too high. The S-6, S-2, and electronic warfare officer will then have the confidence to recommend to the commander a communications support plan that reduces, or entirely prohibits electronic communications.

1-12. Signal Soldiers and operators will have the skills to employ communications and electronics (C&E) equipment in severe conditions without external sources of support. However, they will be able to incorporate support from a field service representative (FSR), logistics assistance representative (LAR), adjacent unit, host-nation assets, or other external sources when available.

1-13. Leaders in the institutional and organizational domains, including Signal School cadre, signal unit commanders, BEB commanders, S-6s and assistant chief of staff for communications (G-6), and signal noncommissioned officers, must instill in Soldiers the skills and confidence they will need for the next war. This training strategy establishes the guidance the Army will use to implement training.

Chapter 2 Foundations

READINESS PRECEPTS

2-1. **Leadership**. The keystone of readiness is empowered leadership, which provides the motivation, guidance, and direction to execute training, maintenance, and the employment of capabilities. Leadership is required in all aspects of training and maintenance (see Figure 2-1).

2-2. **Training**. Every operation demands competent Soldiers; competence is a direct result of properly planned, resourced, and executed training. Chapter 3 discusses signal training guidelines.

2-3. **Maintenance**. Competent Soldiers are useless on a battlefield if they do not have functioning equipment with which to fight. Chapter 4 discusses C&E maintenance guidelines.



Figure 2-1. Signal readiness precepts

QUALITIES OF THE SIGNAL SOLDIER

2-4. The Signal Corps strives to meet the needs of commanders and warfighters with competent, well rounded, and multi-disciplined signal Soldiers. They will embody the following qualities (see Figure 2-2):

2-5. **Leader**. Faced with uncertainty and challenging requirements a signal Soldier is, at core, a leader. A signal Soldier is confident and works through problems while leading from the front to support the organization and commander.

2-6. **Team Player**. Signal Soldiers will embrace a team mentality with other Soldiers regardless of military occupational specialty (MOS), branch, or Service. Signal Soldiers incorporate teamwork in all that they do. The future will require smaller teams capable of planning, maintaining, and employing signal systems autonomously to meet mission requirements.

2-7. **Communicator**. Signal Soldiers will have the fundamental theoretical knowledge that underpins communications and how it supports operations. Signal individual training will emphasize signal-related concepts and theories over specific assemblages and systems, creating adaptive and resourceful signal Soldiers.



Figure 2-2. Qualities of the signal Soldier

ATTRIBUTES OF THE SIGNAL SOLDIER

2-8. The Signal Corps will endeavor to instill the following attributes that support the qualities of the signal Soldier (leader, team player, and communicator).

2-9. **Comfortable with uncertainty**. Signal Soldiers will leverage their technical proficiency to engender confidence both within themselves and from their commanders. They will be capable of training and thriving in rigorous, unpredictable environments. They will address the known problems while maintaining their composure and confidence in the face of the unknown.

2-10. **Creative and unorthodox**. In addressing the unknown, signal Soldiers will think beyond conventional solutions. They will apply their broad technical proficiency to address complex problems. Whether repurposing old equipment to meet new challenges or engineering solutions to emerging technical problems, signal Soldiers will be capable of innovating and independently executing current capabilities towards future problems.

2-11. **Resilient**. Signal Soldiers will have the hardiness and depth of character to persevere in arduous operational environments, while also demonstrating the ability to overcome equipment and human attrition. Because a peer threat will be able to inflict combat losses on the Army, signal Soldiers will be able to absorb combat losses and continue the mission. They will be prepared psychologically to deal with casualties and technically to deal with reduced capabilities.

2-12. **Culturally fluent**. Signal Soldiers will be attuned to their potential impact to the information environment, and they will be capable of cooperating with multinational partners. Signal Soldiers will be familiar with the strategic implications of their actions through social media and the near-instantaneous, widespread dissemination of any activities and information that appear online. A guarded and purposeful online presence is the hallmark of a signal Soldier. Soldiers will be competent and sophisticated in their approach to interoperability, ready to engage with partnered forces—both allied and host-nation.

2-13. These attributes act as guideposts for signal training. As lifelong learners, signal Soldiers will continuously invest in these attributes. As lifelong trainers, they will use these attributes to guide the structure and purpose of training. Developing these attributes will prepare signal Soldiers to enable mission command in future operational environments.

SIGNAL SUPPORT TO OPERATIONS: "THE FIGHT TONIGHT"

2-14. The Signal Corps will align training and readiness functions to prepare for current, emerging operations across the conflict continuum (see Figure 2-3). As new threats emerge, units must adapt

their signal training to the environment and conditions. No longer may units depend upon the static signal systems employment methods seen during the last 10 years of counterinsurgency operations.



Figure 2-3. Notional operations across the conflict continuum

2-15. The joint phasing model (see Figure 2-4) highlights the distribution of activities normal in each phase of large-scale combat operations. Units must plan and resource signal training that accounts for the communications requirements, constraints, and capabilities necessary to support operations by phase and strategic role (see Figure 2-5).

2-16. During phases I–III of large-scale combat or limited contingency operations, units may need to subsist on a much smaller communications footprint or capability than during phases IV and V.

2-17. Battalion and below echelons conducting maneuvers may primarily rely on tactical radios for voice and data communications systems like Joint Capabilities Release for PNT and common operational picture (COP). Downlink systems, such as Global Broadcast Service for intelligence feeds, may be used because of the timing and tempo of rapid maneuver. Higher echelons may have more networks that are static, with a larger range of mission command services, but may need to operate at a reduced footprint when displacing.

2-18. Commanders should embrace a smaller communications footprint during home station training to prepare their formations for the rigors of the projected operational environment.



Figure 2-4. Notional large-scale combat joint phasing model



Figure 2-5. Army strategic roles and their relationships to joint phases

PACE PLANS THAT ENABLES MISSION COMMAND

2-19. Communications systems enable mission command. The biggest communications challenge to the unit is planning and employing viable primary, alternate, contingency, and emergency (PACE) plans both within phases and during phase transitions. Units must be able to anticipate critical communications transitions and build PACE plans that support operations throughout the transitions. If possible, PACE plans should revolve around warfighting functions. The principal warfighting functions for the purposes of PACE planning are movement and maneuver, intelligence, fires, and sustainment (See Table 2-1 for sample PACE plan by Warfighting Function). Units should employ PACE plans at home station training that replicate how the unit will operate in combat. In order to accomplish this, unit operators and signal Soldiers must train and employ the use of multiple organic communications capabilities in conditions that mimic the operational environment.

2-20. Historically, the Army has fielded one hardware system to provide one service or type of communications (example, Single Channel Ground and Airborne Radio System (SINCGARS) for line of sight, VHF communication). Advances in technology have blurred this line. The Army now fields radios that can operate in multiple parts of the electromagnetic spectrum. To reduce confusion and retain options for radio operators, units should begin referring to radio waveforms or frequency bands instead of specific radio systems in their training and PACE plans. Typical examples of these include HF, VHF, UHF, and Soldier Radio Waveform (SRW). Common equipment that uses these waveforms and frequency bands includes the following:

- SINCGARS radio platform (VHF—commonly referred to as FM).
- Harris Radio AN/PRC-150 (HF).
- AN/PRC-117G (both VHF and UHF—commonly referred to as TACSAT).
- AN/PRC-154 radio (SRW).

	Movement and Maneuver	Intelligence		Fires	Sustainment
Primary	VHF (CMD NET) VHF (O&I)			AFATDS	VHF (A&L)
Alternate	UHF (TACSAT)	JBCP		VHF (voice)	JBCP
Contingency	JBCP	UHF (TACS	SAT)	VHF (digital)	UHF (TACSAT)
Emergency	HF	TransVerse	;	JBCP	TransVerse
Legend: AFATDS Advanced Field Artillery Tactical Data System A&L administrative and logistics CMD command FM frequency modulation		Data	HF JBCP O&I TACSAT VHF	high frequency Joint Battle Comma operations and intel tactical satellite very high frequency	nd Platform ligence

Table 2-1. Sample PACE by Warfighting Function

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Chapter 3 Signal Training

SIGNAL TRAINING VISION

3-1. Signal training should be a deliberate, continuous, sequential, and progressive process embedded into the UTP. Commanders need to understand the importance of providing enough time and resources for signal training. Prior to unit collective training events, the unit plans enough time for signal training with no users or customers, providing operators with the necessary repetitions and sets in a static environment before moving to dynamic training environments. Signal training should occur with the right capabilities organic to the unit. If commanders and staffs take shortcuts during unit training and do not exercise their organic capabilities with rigorous, realistic training, they put the overall UTP and mission at risk.

3-2. Signal training is predicated on properly maintained equipment. Consequently, C&E maintenance must be integral to signal training. Commanders should deliberately plan and execute C&E maintenance on a regular basis. Signal training and C&E maintenance must be synchronized at all levels over the planning horizon to support unit readiness. For further discussion of C&E maintenance guidelines, refer to Chapter 4.

3-3. The foundation of outstanding signal support is an organization of competent, confident, and cohesive teams. Commanders should emphasize training to build teams that can employ signal systems, operate independently, and build capability over time. Commanders may use the 8-step training model (see Figure 3-1) to verify that the major steps to plan and resource signal training have occurred.



Figure 3-1. 8-step training model

TRAINING IMPLEMENTATION

3-4. Signal training for all branches and MOSs at the individual level begins with initial military training and continues throughout a Soldier's career via individual, organizational, and institutional

development (refer to Appendix B for institutional signal training objectives). Signal individual training focuses on operation and maintenance of assigned radio, transmission, and networking systems. Individual signal training should be nested within the unit's training and should provide the foundation to progressive collective training in support of a higher headquarters mission-essential task (MET). Leaders need to understand the relationship of effectively managing combat power to mitigate the risk to unit readiness. Changes in combat power impede units from meeting the required Army Objective-T standards to progress thru individual and collective training in a timely manner.

3-5. The concepts of network, transmission, and radio are the triad of signal support to the warfighter (Figure 3-2). Network systems enable units to interconnect and pass information between their mission command information systems (MCIS). Transmission systems allow units to extend networks beyond geographic boundaries. Personnel and vehicular radio systems provide push to talk voice and data communications to units.



Figure 3-2. Triad of signal support

COLLECTIVE SIGNAL TRAINING

3-6. Collective training begins at the team level and increases in scope and complexity at each echelon. To successfully train for mission essential tasks, higher echelons must allocate sufficient time and resources to subordinate unit training. This training includes both mission command systems integration training supporting the warfighting functions and signal unit training. Units are encouraged to use the collective signal training template as a guide to including mission command and signal training into their UTPs (Table 3-1).

3-7. The template divides signal training into four distinct frequencies (weekly, monthly, quarterly, and semiannually), delineated by echelon and between BCT signal companies, signal companies within the expeditionary signal battalion, and brigade and battalion S-6 sections. Training at each echelon builds upon the training at lower echelons with the ultimate aim of integrating signal capabilities that enhance maneuver unit collective training. For narrative guidance on implementing the collective signal training template, see Appendix A.



Table 3-1. Collective Signal Training Template

Team/Crew Battle Drills (Weekly)

3-8. Well-trained crews and teams that are capable of achieving and sustaining a high level of proficiency are the foundation of effective signal support. Crews and teams build this proficiency by conducting battle drills that focus on individual and collective skills and equipment readiness. A crawl, walk, run approach using weekly battle drills hones the individual and collective skills that support real world mission requirements for speed, precision, and accuracy and allows junior leaders to build teams based on mutual trust. These battle drills can be simple or complex, and can be combined to train at a higher level. Examples of battle drills include: power-up procedures, antenna setup procedures, satellite acquisition and boot file load, outage remediation, troubleshooting radio timing issues, and radio retransmission site setup.

Team & Platoon Training (Monthly)

3-9. Weekly team battle drills lay a foundation that should be built upon by a monthly crew drill that sets the conditions for signal gunnery table I (see Table 3-2). Teams should use the standards outlined in the training and evaluation outline (T&EO) found in the combined arms training strategy (CATS). Platoon training incorporates multiple crews and teams into a collective training event and sets the conditions for signal gunnery table II (see Table 3-2). Units should identify time standards that challenge teams and platoons to improve and prepare them for operations in a dynamic operational environment. Units retain the flexibility to combine or sequence team and platoon training in ways that accomplish the training objectives with the resources available to them. Units can find all T&EOs (including Objective-T standards and operational variables) that apply to a crew, team, or platoon by running a search in CATS for task numbers that begin with "11-CW".

Note. See the Army Training Network Website (https://atn.army.mil) for combined arms training strategies.

Company Training (Quarterly)

3-10. Monthly crew, team, and platoon training should progress to a quarterly company-level training event that incorporates all weekly and monthly lower echelon signal training and sets the conditions for signal gunnery table III (see Table 3-2). Company training should progress from dynamic to complex operational environment variables using T&EOs designed for company collective training based on the standardized company mission essential task list (METL) and supporting collective tasks in the METL viewer located on the Army Training Network Website.

Integrative Training (Semi-Annually)

3-11. The focus of the brigade throughout the training cycle is to prepare for a combined arms maneuver integrative training event conducted at home station or at a combat training center. The focus for signal during the integrative training is to culminate all crew, team, platoon, and company-level training previously exercised over the last six months in a complex operational environment. Signal staff integration and Department of Defense information network (DODIN) operations are critical during integrative training and sets the conditions for signal gunnery table IV (see Table 3-2).

SIGNAL GUNNERY TABLES

3-12. Collective signal training serves as a template for collective training that will prepare units to certify their BCT signal company, expeditionary signal company, joint/area signal company, and the battalion and brigade S-6 sections using the signal gunnery tables outlined below. The tables recommend the echelon, tasks, and frequency for certifying events. Certifications should be based on published T&EOs in the unit CATS and are nested within the Army's Objective-T standards.



Table 3-2. Signal Gunnery Tables

3-13. **Table I:** Aligned with team collective signal training. Focused on installation and operation of team level signal systems using T&EOs found in CATS to build precision, accuracy, strength, and aggressiveness. S-6 sections further focus on developing their proficiency in conducting DODIN operations and providing information services. ENDSTATE: Signal leaders certify teams and battalion and brigade S-6 sections to employ their capabilities in a dynamic operational environment at least quarterly.

3-14. **Table II:** Aligned with platoon collective signal training. Increases rigor by incorporating multiple certified teams into platoon-level certification in a dynamic operational environment. Platoon certifications incorporate platoon network transmission path, network switching services, and tactical radio support and may include coordinated events with battalion and brigade DODIN operations elements. ENDSTATE: Battalion and higher echelon signal leaders certify platoons to provide communications in support of a mission at least quarterly.

3-15. **Table III:** Aligned with company collective signal training. Increases complexity by incorporating multiple certified platoons into a company-level certification in a complex operational environment. Company certifications incorporate the company network transmission path, network switching services, and tactical radio support and may include company command post operations and battalion or brigade DODIN operations support. ENDSTATE: Brigade echelon signal leaders certify signal companies on their collective mission essential tasks at least quarterly.

3-16. **Table IV:** Aligned with integrative collective training. Unit teams, platoons, and companies incorporate with battalion and brigade S-6 staff into an integrative certification with DODIN operations functions in a complex operational environment. Brigades undergo certification in conjunction with culminating training exercises and/or combat training center rotations. ENDSTATE: Division G-6 sections certify the collective ability of battalion S-6s, brigade S-6s, and signal companies to plan and conduct DODIN operations at least annually.

3-17. Table 3-3 aligns the collective signal training template with the signal gunnery tables.





3-18. Figure 3-3 summarizes the signal training cycle; the combination of individual and collective training that supports unit proficiency on tasks that enable mission command. Signal training should be cyclical, building and maintaining training proficiency over time.



Figure 3-3. Signal training cycle

MISSION COMMAND INFORMATION SYSTEMS TRAINING

3-19. The scope of managing MCIS includes installation, operation, maintenance, and troubleshooting. Each functional cell has the primary responsibility to manage their associated MCIS platform. Table 3-4 below lists some of the most common mission command systems and their functional leads.

Mission Command Information System	OPR	Role of Signal Support	
AFATDS	Fires Cell		
AMDWS	Protection Cell		
BCS3	Sustainment Cell		
CPOF	Operations Cell		
DCGS-A	Intelligence Cell	Network &	
DTSS	Intelligence Cell	Transmission	
GCCS-A	Operations Cell		
IMETS	Intelligence Cell		
TAIS	Protection Cell		
Legend: AFATDS AMDWS BCS3 CPOF DCGS-A GCCS-A IMETS TAIS	Advanced Field Artillery Tactical Data System Air & Missile Defense Workstation Battle Command Sustainment Support System Command Post of the Future Distributed Common Ground System-Army Global Command and Control System-Army Integrated Meteorological System		

Table 3-4. Co	ommon mission	command in	nformation s	system an	d functional	cell leads

3-20. Units should integrate MCIS training into the overall UTP in two efforts, the training of mission command digital master gunner (MCDMG) and signal digital master gunner (S-DMG), and the subsequent training of battle staffs at home station by the digital master gunners.

3-21. Units register for the MCDMG Course through Army Training Requirements and Resource System (ATRRS) under the school code of 150, and the course code of: 9E-SI/ASI5C/920-ASI5C(CT). The course is held at the Mission Command Center of Excellence at Ft. Leavenworth, KS.

3-22. Units register for the S-DMG Course through ATRRS under school code of 113, course code of: 531-F75 (CT). The course is held at the Cyber Center of Excellence on Ft. Gordon, GA.

3-23. An MCDMG is a subject matter expert that can operate, maintain, integrate, and train others on MCIS to generate a common operational picture for the commander and battle staff using a unit's integrated system-of-systems command post. An MCDMG will possess the ability to integrate, visualize, and troubleshoot the primary MCIS and will be a leader capable of training and mentoring other unit MCDMGs.

3-24. MCDMGs train their units using the digital training tables found in TC 6-0.

3-25. An S-DMG is a 25B or 25U sergeant or above who is a master of the local area network, integrator of Battle Command Common Services and MCISs to serve as the commander's subject matter expert in the command post.

TECHNICAL QUALIFICATION

3-26. As part of individual training, DODD 8140.01 and DOD 8570.01-M require minimum qualification standards for all personnel who use or manage government information systems and tactical and strategic networks. The minimum training requirement for end users is the DOD Cyber Awareness Challenge. The minimum certification for personnel with increased privileges is based on the level of responsibility, and requires more time and attention to achieve as levels of responsibility progress. Refer to appendix D for more details.

3-27. The signal school will train signal Soldiers to perform their duties. This includes requisite technical certifications. However, technical certifications require either continuing education or periodic retesting to maintain the minimum accreditation. Additionally, signal Soldiers may progress to positions of greater responsibility for which they do not yet have the minimum requisite technical certification. Units may also have requirements to certify non-signal Soldiers (for example, Sustainment Automation Support Management Office personnel).

3-28. For these reasons, units must allot time and resources for Soldiers to conduct technical accreditation training, including both continuing education and initial training for more advanced accreditations.

U.S. ARMY SIGNAL SCHOOL TRAINING SUMMARY

3-29. The signal school provides institutional training to the Army and joint force to develop agile, adaptive and innovative leaders that provide communications support to the warfighting functions and conduct DODIN operations. The signal school is comprised of three organizations. For more details, see appendix B.

3-30. The Signal Enlisted Development College trains the Army's total force in entry level skills and knowledge required to deploy, maintain, and operate their equipment (MOSs 25C, 25L, 25P, 25Q, 25U, 25B, 25N, 25S, and additional skill identifiers [ASI]). The Signal Enlisted Development College inspires Soldiers to willingly assume and carry out their responsibilities as technical operators, tactical warriors, and future leaders.

3-31. The Signal Leader Development College provides signal leaders with continued sequential and progressive training and education to produce adaptive leaders—steeped in the profession of arms—that are technically and tactically competent, confident, and capable of leading and enabling mission command while operating with joint, inter-organizational, and multinational partners.

3-32. The Cyber Noncommissioned Officer Academy (CNCOA) prepares noncommissioned officers (NCO) for success through development of a rigorous technical and tactical academic training program. The CNCOA educates NCOs through the Army learning model employing experiential learning, enabling them to lead Soldiers with competence and confidence in an ever-changing and unpredictable cyberspace domain.

CYBER LEARNING CENTERS (FORMERLY SUSTAINMENT UNIVERSITIES)

3-33. The 12 sustainment universities across the Army are being converted to Cyber Center of Excellence (CCOE) cyber learning centers (Figure 3-4). The centers provide training to local commands based on local command requirements and are managed through G-6 channels.



Figure 3-4. Cyber learning center locations

3-34. The cyber learning centers are an extension of the CCOE University at home station and are designed to build and expand on training for specific unit-level, mission requirements (Figure 3-5).



Figure 3-5. Institutional training support to units

3-35. The cyber learning centers are tailored unit needs. The course offerings may be different from one center to the next. One sample of the course offerings is listed in Figure 3-6.

Figure 3-6. Sample course offerings

3-36. For more information about specific courses offered, contact your local cyber learning center using the contact information in Table 3-5.

JOB TITLE	PHONE
Division Chief, TSD	443-861-6128 (o)
Branch Chief, DSB	706-791-6379 (O)
Program Manager, Sustainment University Program	270-798-9506 (o) 785-383-2845 (c)
Commandant, Fort Bliss Sustainment Center of Excellence Fort Bliss, TX	915-744-8265 (o) 915-540-6401 (c)
Commandant, Dragon University Fort Bragg, NC	910-476-3835 (c)
Commandant, Screaming Eagle University Fort Campbell, KY	270-798-0436 (o) 931-217-9593 (c)
Commandant, Iron Horse Sustainment University Fort Carson, CO	719-526-8839 (o) 706-580-6870(c)

Table 3-5. Cyber learning center points of contact

JOB TITLE	PHONE
Commandant, Fort Hood Sustainment University	254-287-1780 (o)
Fort Hood, TX	254-813-8354 (c)
Commandant, Military Intelligence Sustainment University	520-528-0861 (o)
Fort Huachuca, AZ	520-249-3499 (c)
Commandant, Danger's Voice Sustainment University	785-240-4149 (o)
Fort Riley, KS	785-236-0873 (c)
Commandant, Warrior Sustainment University	337-531-0053 (o)
Fort Polk, LA	337-244-3032 (c)
Commandant, Courage University	253-477-1797 (o)
Joint Base Lewis-McChord, WA	253-226-6562 (c)
Commandant, USARPAC Sustainment Center of Excellence Hawaii	706-993-0745 (c)
Commandant, ARCENT Sustainment University Camp Arifjan, KU	DSN- 318-430-5971

Table 3-5.	Cvber	learning	center	points	of	contact
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Chapter 4

Communications and Electronics Maintenance

Signal training is impossible without attentive communications and electronics (C&E) maintenance. The C&E system preventive maintenance checks and services (PMCS) and reporting processes, which include mission command system of systems and subsystem management, are not clearly understood throughout our formations. This has resulted in an unclear picture of the true tactical C&E system readiness state. Years of over-reliance on contracted field service representatives, coupled with tremendous growth of C&E system density and complexity has led to a diminished awareness of, inconsistent understanding of, and a lack of compliance with Army maintenance policy.

S-6s must oversee and track maintenance status of all C&E equipment within their purview, commanders must execute a command maintenance discipline program that includes C&E equipment, and operators must take responsibility for maintaining their own C&E equipment—even if the operator is not a signal Soldier. A renewal of the pride in ownership for communications systems is necessary to instill a proactive maintenance culture starting from a baseline PMCS to prompt submission of maintenance requests with the organic C&E maintenance section. Signal Soldiers will enable and empower non-signal Soldiers to maintain their C&E equipment through training and troubleshooting, but must not become the de facto maintainer.

COMMUNICATIONS AND ELECTRONICS MAINTENANCE PRECEPTS

4-1. **C&E** maintenance must be a priority in the unit's battle rhythm. By conducting routine, scheduled maintenance on C&E equipment, units maintain C&E asset visibility and can adjust training schedules to maximize training time (Figure 4-1). A C&E maintenance plan should be a signed unit policy at the battalion level or higher. This policy will outline the division of

responsibilities for all C&E assets within the unit, a schedule for performing PMCS on various C&E equipment, and the procedure to elevate C&E maintenance issues to the appropriate maintenance elements.

4-2. **Stress equipment**. During weekly C&E maintenance, units will place a live load on C&E equipment that stresses the system. S-6s will endeavor to replicate realistic, rigorous mission environments when conducting C&E maintenance to reveal equipment issues. Commanders should develop a C&E maintenance focus of the week or equivalent that is based on current challenges, maintenance trends, or preventative topics that gain added attention and inquiry with Soldiers during PMCS terrain walks. Focus topics are in addition to quality PMCS actions; not a replacement. A deliberate, consistent and engaged effort by command teams is crucial to revitalize a proactive and effective maintenance culture.



Recommended Template: Monday: Motor Tuesday: Communications & Electronics

Figure 4-1. Maintenance Battle Rhythm

4-3. **Develop field maintenance procedures**. Maintenance cannot stop in the field or any expeditionary environment. However, failing to plan how and when maintenance will be performed on C&E equipment once it is in operation in a field environment can lead to unplanned service

interruptions. Units avoid this by developing, validating, and executing appropriate maintenance procedures in advance. Key enablers in developing and executing field maintenance standard operating procedures, concept of operations, or concept of support specific to C&E maintenance are the ordnance electronic systems maintenance warrant officer (948B), maintenance control officer and support operations officer. We must improve the synchronization and collaboration between our signal officers, network management warrant officers, NCOs, and key ordnance logisticians on these functions that are imperative to our collective success.

4-4. **Incorporate FSRs and LARs**. Units must be capable of employing and maintaining their C&E equipment without the assistance of FSRs and LARs. However, units should not shy away from capitalizing upon the expertise resident in their FSRs and LARs as part of a sustainment training strategy. FSRs and LARs augment capabilities and specialized skills. FSR and LAR support should be used as an opportunity to develop operator expertise. All requests for external support of mission command, tactical network or tactical radio systems should be routed through the signal network management technician (255N) and/or the ordnance electronic systems maintenance warrant officer (948B) via the unit's DODIN operations element. This ensures centralized reporting and readiness efforts for support from CECOM, brigade logistics support team, regional support center, or any form of contracted field support representatives.

COMMUNICATIONS AND ELECTRONICS ASSET VISIBILITY

4-5. Tracking C&E maintenance. The S-6 will maintain the communications status report as part of the signal running estimate. The communications status report will show the systems authorized, on-hand, and fully mission capable. The S-6 may tailor the communications status report to track only those systems the commander has prioritized. At the battalion level, the S-6 is also responsible for supervising C&E maintenance. In addition to the S-6 communications status report, C&E readiness reporting for program of record or life cycle managed systems must be accomplished through two official Army systems of record: unit status report and Global Combat Support System-Army (GCSS-Army). To accurately report C&E readiness posture to Headquarters, Department of the Army (HQDA) G-4, G-6, and G-8, priority effort must be given to configuration of signal system of systems into GCSS-Army. Inaccurate historical readiness data equates to an incomplete picture of our readiness status to senior leaders. This incomplete picture impacts the justification efforts for operation and maintenance, Army and training resource model funding due to a lack of readiness visibility at Army Service component command and HQDA levels. Readiness reporting criteria updates to the maintenance master data file and recent completion of an equipment readiness code (ERC) study for signal-centric platforms facilitates improved GCSS-Army reporting. Non-PORs that are not maintenance master data file-reportable in accordance with AR 700-138 can be identified as significant items on the unit status report for a limited measure of visibility.

4-6. **Signal System of Systems**. The complex nature of C&E systems dictates that they be treated as systems comprised of multiple subsystems (Figure 4-2). They are analogous to weapon systems. Pacing and critical communications system of systems should be added to combat power reports to increase awareness and understanding of their mission criticality beyond the signal community. These reporting efforts and the increased awareness should drive maintenance concerns, maintenance priorities, and overall readiness. Failing to configure systems appropriately perpetuates inaccurate reporting and degraded readiness.

4-7. **Maintenance remediation at lowest level**. A proper C&E maintenance culture requires that when an operator cannot rectify a maintenance fault at the 10-level, leaders elevate the requirement through signal leaders and the C&E maintenance shop work to

The Signal Corps recommends adopting maintenance status of sub-system as the maintenance status of the overall higher system

If the sub-system is deadlined, the higher system is deadlined

Figure 4-2. Sub-system Maintenance Status

rectify the fault at the 20-level. Once the C&E maintenance shop verifies the fault to avoid unwarranted evacuation of spares without genuine hardware faults or overlooked software or firmware version faults, the item is evacuated to the appropriate higher-level maintenance facility.

If equipment is evacuated and there is no evidence of failure, this wastes unit operational funds for commercial shipping, negatively impacts readiness, and reduces an already limited inventory of spares. Table 4-1 provides an example evacuation process for battalion- and brigade-level units with a C&E maintenance shop available.

System Category	Example	Evac Type/ Process	Tracking Mechanism	OPR/P OC	Notes
PM Warranty Equipment	WIN-T COEI, HPA for STT, Linkway Modem, LNB, AN/TYQ-155 BCCS, GRRIP AN/PSC-15, UPS	C&E 5988E/ Maintenance Request	GCSS-Army	C&E, CECOM LAR, FSR, SRA	Spares management and timely evacuation of equipment is critical. Replace onboard spares, and then evacuate the faulty item through C&E to the appropriate repair activity. This will enable visibility in unit status report readiness reporting (PIEMC/PERRY). Work request through GCSS-Army will be used to capture demands and serve as the tracking mechanism for the warranty action. If a centrally managed spare is available at the C&E section, a one for one exchange will be done and the work request will be closed. The C&E section will then open their own work request and evacuate the item accordingly for repair or replacement.
Signal C&E Legacy Equipment (Shelter)	TRC 190 Baseband/R adio, ASIP 1523E, PRC- 126, AN/PRC-148 (MBITR), AN/PRC- 154, PP- 6224, PSN- 13 DAGR, CSS-VSAT, TSQ-232 CPP, JRC/JBC- P/BFT, Fiber Optic Cable	C&E 5988E/ Maintenance Request	GCSS-Army	C&E, CECOM LAR, FSR, SRA	Nost equipment to include shelters themselves can be repaired at field level. CECOM and Tobyhanna Army Depot conduct reset, overhaul and sustainment maintenance

Table 4-1. Equipment evacuation process

System Category	Example	Evac Type/Proces s	Tracking Mechanism	OPR/P OC	Notes
COMSEC Equipment	KG 175A, KG 175G, KIV 7, PYQ- 10, KG-250	C&E 5988E/ Maintenance Request; Open job in ISSP, request RMA/ Shipping	GCSS-Army, 1348, SF- 153	C&E, CSLA NMP	A work request through GCSS-Army will capture demands and help identify trends. COMSEC Equipment faults will be verified by C&E maintenance personnel. Once the fault is confirmed, NRTS or code out paperwork will be generated and a COMSEC zeroize memorandum will be drafted. The faulty equipment will be returned to the unit for processing through supporting COMSEC account manager if the C&E maintenance section does not have an ISSP account.
Prime Mover	M1089, M998 Vehicle, JLTV	5988E turned in to BMT	GCSS-Army	BMT	
PGEN	10K, 5K, 3K, On Board Generators	5988E turned in to BMT	GCSS-Army	BMT	If a generator is critical to a system (part of a WIN-T system) it deadlines the entire system in addition to the generator.
COTS	Redline Radio AN- 80, IP or Wireless Intercom Systems, Inflatable SATCOM Antennas (ISA)	C&E 5988E/ Maintenance Request; CECOM LAR, DSE or FSR w oversight based on equipment type	GCSS-Army	C&E, CECOM LAR, FSR, SRA	A work request through GCSS-Army will capture demands, identify potential trends and serve as the tracking mechanism for the evacuation actions/RMAs.

Table 4-1	Fauinmer	t evacuation	nrocass
	Lyuipinei	ii evacuation	process

Legend:
ASIP – advanced SINCGARS improvement program
BCCS – Battle Command Common Services
BMT – brigade or battalion maintenance technician
CECOM – U.S. Army Communications-Electronics Command
C&E – communications and electronics
COEI – components of end item
COMSEC – communications security
CSLA – Communications Security Logistics Activity
DSE – digital systems engineer
FSR – field support representative
GCSS-Army – Global Combat Support System-Army
GRRIP – Global Rapid Response Information Package
HPA – high power amplifier
ISSP – information systems security program
JBC-P – joint battle command platform
LAR – logistics assistance representative
LNB – low noise block downconverter
OPR – office of primary responsibility
PERRY – percentage of on-hand equipment fully mission capable
PGEN – power generation
PIEMC – percentage pacing item on-hand fully mission capable
PM – program manager
POC – point of contact
SATCOM - satellite communications
SRA – specialized repair activity
STT – Satellite Transportable Terminal
UPS – uninterruptable power supply
WIN-T – Warfighter Information Network-Tactical
** Notes:
1. At the BCT, your BMT, C&E Maintenance OIC, BLAST Chief, DSE, are your first lines of defense on
Non-Standard Maintenance
2. GCSS-Army (AR 750-1, 4-15e: GCSS-Army will be the principal and comprehensive business
automation enabler for the Total Army's (Active Army, National Guard, Army Reserve to include the
supporting civilians and contractors) logistics Information Technology (IT) mission area.

4-8. Validate the C&E unit basic load. The C&E unit basic load should include repair parts and consumables, such as batteries. The BCT S-6 should continue to monitor the unit basic load after validation and make changes when necessary.

4-9. **Order repair parts**. As the advocate for C&E maintenance, the S-6 should periodically review the document control register or order status report (GCSS-Army or equivalent) to maintain visibility on repair parts order statuses. Implementation of an effective command maintenance discipline program reinforced by a current, relevant and enforced standard operating procedure is a fundamental action. The foundation of C&E command maintenance discipline program is the execution of a PMCS utilizing current and approved technical manuals by the appropriate 25 series MOS or the designated general purpose user (GPU) with 25 series fault validation oversight. After a PMCS is completed, NCO-Soldier follow through must occur to ensure prompt completion of the maintenance request process to obtain fault resolution, spare replacement or a scheduled service. The maintenance culture from the PMCS execution to the closing of a maintenance request must be reinvigorated immediately.

4-10. **Validate spare components**. The S-6 should conduct an accurate inventory and validation of all spares no less than quarterly. Spares (shop-stock) must be accounted for on a component of end item hand receipt or must be accounted for as shop-stock IAW AR 710-2. Centralized management of spares for mission command or Warfighter Information Network-Tactical (WIN-T) platforms is normally best executed by the organic C&E maintenance section. Low-density, long-

lead time line-replaceable units with mission essential impacts across a brigade or battalion must be intensely managed. Replacement of unserviceable company or team on-board spares must be initiated promptly via the proper organic maintenance source. Prolonged retention of unserviceable spares post-maintenance diagnosis by the signal company or team personnel can severely delay the overall replacement timeline. Spares management also affects various quarterly, semiannual or annual services performed by our signal and ordnance maintainers.

4-11. Management of spares through the C&E maintenance shop generates parts demand history for future spares retention on the C&E maintenance shop's shop stock list or a supply support activity's authorized stockage list. Maintainers can generate a GCSS-Army supply demand history for spares, even if replacements are obtained from warranty, vendor exchanges, common hardware system, or the standard Army requisition process.

4-12. The collection of empirical statistical data must start being compiled for future analysis for maintenance trends, systemic parts failures or line-replaceable unit requisition demand history to maintain parts procurement actions at the wholesale level. The C&E maintenance shop can sustain spares to facilitate replacement of company through team unserviceable line-replaceable units while providing the flexibility required to support missions. Ongoing coordination between the S-6, S-3, S-4 and the electronic systems maintenance warrant officer identifies the proper logistics package required to support a training or operational mission based on C&E platform types, quantity, location remoteness, and duration of mission within the commander's intent. This allows for better prioritization, balanced C&E maintenance shop manpower support and efficient spares utilization in support of tactical operations.

4-13. Signal leaders across all cohorts must promote the importance of C&E maintenance by highlighting its impact on operations. The better warfighting commanders understand how C&E maintenance impacts their ability to command the more likely they will allocate the time, resources and emphasis needed to improve the C&E readiness posture.

Chapter 5

Conclusion

The character of war is changing and the Army must adapt its training to accomplish its missions in the next war. Soldiers will succeed in future operational environments by the way they have trained and maintained their C&E equipment. Leaders will persevere by the way they build effective teams to employ signal capabilities.

This signal training strategy is the basis for deliberate planning and training of Soldiers, leaders, and units to address the challenges of the next conflict along the precepts of leadership, training, and maintenance. Unit training strategies focusing on these three precepts will transition the force from a unit preparing for planned deployments to units actively ready for a decisive action environment against a near-peer threat.

This document provides direction for leaders to develop unit training plans and maintenance plans that integrate their signal capabilities. These plans must encompass a principle of mission adaptability, with training that fosters critical and creative thinking at all echelons to prepare and develop dynamic leaders.

It is clear that the employment of the Signal Corps will be fundamentally different in the future than what has sufficed in the past. Training methodologies and leader development must evolve to meet the challenges of tomorrow. By evolving for the future, the Signal Corps will remain *watchful for the country*.

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Appendix A

Training—A Way

All leaders encounter a similar challenge as they analyze training needs and develop their UTP: how to preserve the training time and resources necessary to develop individual and collective skills prior to supporting higher echelon collective training. This challenge is compounded for brigade signal companies and S-6 sections that—

- Are required to support all training events utilizing information networks or mission command systems.
- Can inhibit maneuver training objectives without a comparatively high skill competence and equipment readiness.
- Have both complex skills and equipment.

This challenge is now shared by BEB commanders who must balance their training needs and priorities with the direct support relationship between the BCT and its signal company.

This appendix serves as a guide for BEB commanders and their supporting signal leaders in the battalion and the BCT to set the conditions for successful mission command at the BEB and brigade levels in future collective training events. This appendix will use the and the HQDA standardized METL for the maneuver unit's brigade signal company with the collective signal training template and signal gunnery tables (Chapter 3, Figure10) to illustrate a feasible way to nest signal training with the operational training plan in a resource constrained high-operational tempo environment.

EXAMPLE IBCT SIGNAL COMPANY MISSION ESSENTIAL TASK LIST (TOE- 11307R900)

A-1. MET 1- Provide Network Transmission Path for Brigade Signal Companies (<u>11-CO-</u><u>9060</u>)

- Establish a Satellite Transportable Terminal (STT) (WIN-T Increment 2) (<u>11-CW-6050</u>)
- Establish a High Capacity Line-of-Sight (HCLOS) Radio Terminal AN/TRC-190(V) (<u>11-CW-7022</u>)
- Establish the Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T) AN/TSC-154 (<u>11-CW-7173</u>)
- Conduct Troop Leading Procedures for Companies (71-CO-5100)

A-2. MET 2- Provide Network Switching Services for Brigade Signal Companies (<u>11-CO-</u><u>9070</u>)

- Establish a Tactical Switching Service Node (<u>11-CW-6002</u>)
- Conduct Troop Leading Procedures for Companies (71-CO-5100)

A-3. MET 3- Provide Tactical Radio Support for Brigade Signal Companies (11-CO-9075)

- Conduct Combat Network Radio (CNR) Retransmission (RETRANS) Operations (<u>11-CW-7017</u>)
- Operate a Combat Network Radio (CNR) System (<u>11-CW-8013</u>)
- Conduct Troop Leading Procedures for Companies (71-CO-5100)

A-4. MET 4- Conduct Expeditionary Deployment Operations in Support of the Offense, Defense, Stability and defense support of civil authorities (DSCA) (<u>55-CO-4830</u>)

- Perform Pre-deployment Maintenance Activities (<u>43-CO-4805</u>)
- Perform Deployment Alert Activities (<u>55-CO-4801</u>)
- Conduct Staging Activities (<u>55-CO-4826</u>)
- Plan Unit Deployment Activities Upon Receipt of a Warning Order (<u>55-CO-4828</u>)
- Conduct Unit Redeployment (55-CO-4829)
- Prepare Personnel for Deployment for Companies (71-CO-0004)
- Conduct Troop Leading Procedures for Companies (<u>71-CO-5100</u>)

A-5. The BEB commander in this example has assumed command following the BCT's redeployment and faces a combat training center rotation at the end of the year. The BEB Commander recognizes that the signal company will be required to support multiple BCT and BEB collective training events and that the focus of the company during these events will be mission support. The BEB commander understands that the BEB staff and signal company must develop a UTP that provides the time and resources develop and certify skill proficiency outside of BCT and BEB collective events. The BEB commander realizes the number and complexity of signal tasks and equipment and ensures that the staff considers the following in the BEB UTP:

• Long Range Training Resource Planning:

- A satellite access request (SAR) is required for any communications system that includes a satellite terminal. These requests are routed up and through geographic combatant command staff. Consequently, most units require SARs no less than 90 days before a training event.
- Spectrum management requests for other communications systems or missions may need to be coordinated through multiple echelons depending on the availability of frequencies and the terrain traversed. Requests in forward deployed units may also require the approval of the host nation. Many units require 45-day leads for requests though some, including forward-deployed units, require 90 days or more for hostnation coordination and approval.
- Requesting resources inside of these timeframes often requires letters of lateness from the first O-6 in the chain of command.
- Routine Maintenance breeds success:
 - Many communications issues are, at root, maintenance issues.
 - Most communications equipment requires PMCS.
 - PMCS 10-level checks are the responsibility of the assigned operators. Most units have too many systems to be effectively maintained by signal Soldiers alone.
 - Routine PMCS by operators builds familiarity and reduces the training burden on commanders and signal Soldiers.
 - Most units have too many communications systems to assume operators are completing them on top of vehicle maintenance in one day.
 - Many units succeed by dedicating a second day to C&E maintenance.
- Signal Training and C&E Maintenance Synchronized:
 - In order for teams, platoons and companies to be certified on a quarterly basis both equipment and personnel must be ready.
 - Planners must incorporate a deliberate method to ensure equipment is fully validated weekly, monthly, and quarterly.
 - Planners must synchronize the collective training events with the equipment validation or the certification will become delayed.

 The UTP must include both signal training and C&E maintenance to ensure a fully ready team, platoon, and company are capable to support the maneuver commander (see Figure A-1 below for a method to synchronize the effort).



Figure A-1. Synchronizing training and maintenance readiness

- Mission Command Information System Integration:
 - Training resources for MCIS (such as Command Post of the Future and Advanced Field Artillery Tactical Data System) are targeted at the operators.
 - BCTs and battalions with MCIS should appoint one or more battle NCO to be MCDMG and send them to training with the Mission Command Center of Excellence.
 - BCT and battalion S-6s should appoint one or more signal NCOs to be signal digital master gunners and send them to training with the CCOE.
 - The Mission Command Center of Excellence has available resources to assist units in building and developing proficiency in command post operations that effectively integrate MCIS.
 - MCIS and associated operators should be included in all communications exercises prior to collective training.
- Communications Security (COMSEC)
 - Most military communications systems require COMSEC. Units should assess the needs of their unit to select and train the appropriate number of hand receipt holders prior to collective training.
- Cross Training reduces capability gaps
 - The Signal Corps is comprised of Soldiers with many, distinct specialties. Maneuver units are authorized most of these specialties in low density.
 - Cross training within signal units and staff can temporarily mitigate some of the burden of loss or turnover.

A-6. Using the signal company's standardized METL, training guidance from the BCT, the collective signal training template and signal gunnery tables (chapter 3, Table 3-3), and the above considerations, the BEB commander—

• Identifies key BCT training events (Figure A-2).



Figure A-2. Notional brigade combat team training events



• Identifies the BEB training events that nest within the BCT's timeline (Figure A-3).

Figure A-3. Notional brigade combat team and brigade engineer battalion training events

- Assesses the task cross-walk conducted by the BEB staff and signal company commander and validate the team, platoon, and company tasks necessary to support collective training at the BEB and BCT.
- Directs the staff and signal company to use CATS to gain understanding of the time and resources necessary for team, platoon, and company training.
- Uses the objective training standards in CATS as a guide for developing an assessment strategy.
- Identifies creative solutions to time and resource scarcity and accepts informed, prudent risk where necessary (Figure A-4).



Figure A-4. Notional signal company training analysis

• Develops feasible UTPs for the signal company that supports the needs of the BEB and BCT.

A-7. Using the signal company's standardized METL and training guidance from the BCT, the BEB commander and staff develop a UTP that nests effectively within the BCT's UTP (Figure A-5).



Figure A-5. Example operationalized training plan

A-6

Appendix B Institutional Training

INSTITUTIONAL DOMAIN (U.S. ARMY SIGNAL SCHOOL)

B-1. The institutional training domain is the Army's formally established training and education system, which primarily includes training base centers and schools that provide initial entry and MOS transition training and subsequent professional military education for Soldiers, military leaders, and Army civilians. Signal institutional training is conducted at Fort Gordon, Fort Meade, various accredited Reserve Component regional training institutes, and through distributed learning tools. This appendix introduces the institutional training provided by the U.S. Army Signal School.

FOUNDATION TRAINING (SIGNAL SOLDIER COMMON CORE)

B-2. Common core training and education is the combination of common military tasks, common leader tasks, and directed or mandated tasks for specific courses, grade or skill levels, or organizational levels regardless of branch, career management field, or program.

B-3. Based on feedback from signal commanders' lessons learned and best practices, the signal training developers identified common tasks that lays the foundation to create a baseline in computer basics, IP and network essential fundamentals for Advanced Individual Training (AIT) Signal Soldiers. Training will be progressive in nature beginning with computer basic hardware/ software fundamentals and transitioning to network fundamentals and cybersecurity. Signal Soldiers will have a better understanding of network operations, and the capability of delivering integrated communications in support of the Warfighter. These topics are now collectively referred to as signal foundation training. The overall time required to train common core foundation training for each MOS is depicted in Figure B-1.



Figure B-1. Signal foundation training

U.S. ARMY SIGNAL SCHOOL BRANCHES

B-4. The Signal School provides initial military training, advanced training, and skills training for both officers and enlisted Soldiers. Initial military training provides an orderly transition from civilian to military life. Advanced training includes professional development courses for commissioned,

warranted, and noncommissioned officers using both TRADOC directed and Signal Corps specific curricula. Skills training includes courses that teach Soldiers specialized courses of instruction to prepare them for unique roles or tasks. A brief introduction to the Signal School branches and courses follows.

Signal Enlisted Development College

B-5. The Signal Enlisted Development College trains the Army's total force in entry level skills and knowledge required to deploy, maintain, and operate their equipment (MOSs 25C, 25L, 25P, 25Q, 25U, 25B, 25N, 25S, and additional skill identifier (ASI) courses). The Signal Enlisted Development College inspires Soldiers to willingly assume and carry out their responsibilities as technical operators, tactical warriors, and future leaders.

- 25C1O Radio Operator Maintainer, 12 weeks 4 days
- 25L10 Cable Systems Installer Maintainer, 10 weeks 2 days
- 25P10 Microwave Systems Operator Maintainer Common Core, 10 weeks 1 day
- 25P10 (TACT-1 ASI 7D)-Microwave Systems Operator Maintainer, 9 weeks
- 25P10 (STRAT-1 ASI 7E)-Microwave Systems Operator Maintainer, 9 weeks
- 25Q10 Multichannel Transmission System Operator Maintainer, 16 weeks
- 25U10 Signal Support Systems Specialist, 16 weeks
- Special Qualification Identifier I Basic Installer Course, 6 weeks
- ASI J2 Antenna Installation Course (Tower School) 13 weeks 1 day
- 25B10 Information Technology Specialist, 19 weeks 3 days
- 25N1O Nodal Network Systems Operator-Maintainer, 25 weeks 1 day
- 25S10 Satellite Communications Systems Operator-Maintainer, 28 weeks 4 days
- ASI 1C Satellite Systems/Network Coordinator, 17 weeks 4 days

PROFESSIONAL MILITARY EDUCATION

B-6. Professional military education consists of progressive levels of military education that convey the broad body of knowledge and professional competence essential for the military professional's career progression.

Signal Leader Development College

B-7. The Signal Leader Development College provides signal leaders with continued sequential and progressive training and education to produce adaptive leaders—steeped in the profession of arms—that are technically and tactically competent, confident, and capable of leading and enabling mission command while operating with joint, inter-organizational, and multinational partners.

- Signal Basic Officer Leader Course (SBOLC), 16 weeks
 - The Signal Basic Officer Leader Course mission is to graduate competent, accountable leaders who are able to leverage technical platforms in order to deliver tactical communications to the warfighter, enabling mission command.
- Signal Captains Career Course (SCCC), 20 weeks
 - The Signal Captains Career Course equips leaders with signal technical and tactical knowledge, skills and abilities to be agile and adaptive in leading company-sized units and executing the role of the battalion S-6 in support of unified land operations to win in a complex world.
- Signal Captains Career Course—Reserve Component
 - The Signal Captains Career Course Reserve Component course consists of four phases that provide students the skills, knowledge, and abilities to perform critical signal officer tasks. The Reserve Component course is designed to achieve the same outcomes as the SCCC course.

- Phase 1: Signal Common Core Distance Learning
- Phase 2: Signal Common Core (2-week resident course)
- Phase 3: Mid-Level Learning Continuum Common Core Distance Learning
- Phase 4: Mid-Level Learning Continuum Common Core (2-week resident course)
- Battalion S-6 Course, 5 weeks 2 days (SI6B)
 - The battalion S-6 course provides signal officers the instruction required for assignment as a battalion S-6. Instruction includes the capabilities, limitations, and employment of signal- and user-owned equipment as it supports the warfighter. The course culminates with a capstone exercise.
- Brigade S-6 Course, 2 weeks (SI6N)
 - The brigade S-6 course provides signal officers the instruction required for assignment as a brigade S-6. This includes the relationships between the brigade S-6 and the BEB, the brigade signal company, and the division G-6. It provides an executive overview of systems organic to a BCT, cybersecurity, and cyberspace operations discussion. The course culminates with a capstone exercise.
- P943 Course (Command and General Staff College prerequisite), 5 days at Fort Leavenworth
- P920 Course (FT Gordon Satellite Command and General Staff College prerequisites), DL
- 25D3O Course, Cyber Network Defender, 8 weeks
- 25E3O Course, Electromagnetic Spectrum Manager, 10 weeks 3 days
- Warrant Officer Basic (23 weeks 4 days weeks) and Advance Course for 255N (17 week 4 days), Network Technician
- Warrant Officer Basic (32 weeks) and Advance Course for 255A (13 weeks 4 days), Information Systems Technician
- Warrant Officer Advanced Course for 255S, Information Protection Technician, 25 weeks
- Signal Warrant Officer Intermediate Level Education Course, 4 weeks 4 days

INSTITUTIONAL PROFESSIONAL NONCOMMISSIONED OFFICER DEVELOPMENT

B-8. In accordance with the one Army school system (OASS) standards, the CNCOA and various Reserve Component regional training institute provide NCOs with progressive and sequential leader, technical, and tactical training relevant to their expected duties, responsibilities, and missions. NCOs are required to perform across a broad spectrum of cyberspace, signal, EW and public affairs operations. The CNCOA offers advanced leader course and senior leader course training.

B-9. The CNCOA and Reserve Component regional training institute hand-select subject matter experts with exceptional leadership competencies from the operational force to serve as small group leader (SGL). SGLs go through a rigorous vetting and training process prior to instructing the force. SGLs are trained in instructor facilitation and technical training, and receive the industry certifications necessary for their MOS curriculum.

B-10. The CNCOA and Reserve Component regional training institute utilize the Army learning model as their basis for instruction. The Army learning model is a student-focused educational model that develops adaptive leaders in an era of persistent conflict. This approach blends institutional instruction and operational experience to promote an environment that utilizes experiential learning.

Cyber Center of Excellence Noncommissioned Officer Academy

B-11. The mission of the CNCOA is to prepare NCOs for success through development of a rigorous technical and tactical academic training program. The CNCOA educates the NCO through the Army learning model employing experiential learning, enabling the NCO to lead Soldiers with competence and confidence in an ever changing and unpredictable cyberspace domain.

- Warrior Leaders Course
- Advanced Leader Course Skill level 3

- The advanced leader course consists of both the structured self-development II course (prerequisite) and the MOS-specific resident course. These courses provide NCOs selected for promotion to staff sergeant an opportunity to acquire the technical and tactical skills needed to lead at the squad and platoon levels. The following tables depict the advanced leader courses and course lengths provided by the CNCOA.
- Senior Leader Course Skill level 4
 - The senior leader course consists of both the structured self-development III course (prerequisite) and the MOS-specific resident course. These courses provide NCOs selected for promotion to sergeant first class an opportunity to acquire the technical and tactical skills needed to lead at the platoon and company levels. The following tables depict the senior leader courses and course lengths provided by the CNCOA.

Appendix C Signal Coordination

SIGNAL COORDINATION

C-1. Figure C-1 provides a graphical representation of the relationships common for signal leaders in a BCT. The BCT S-6 is the senior signal leader responsible for the BCT's signal staff plan, PACE plan, and signal running estimates. The BCT S-6 mentors and trains junior signal officers and teams. The BCT signal company commander is responsible for providing trained and ready personnel and equipment to execute signal support for the BCT. The BEB commander is ultimately responsible for the BEB, including the organic signal company.



Figure C-1. Brigade combat team signal coordination

C-2. The BCT signal company is organic to, and maintains a command relationship with, the BEB commander but directly supports the BCT during operations. To effectively provide this support, the signal company commander maintains an ongoing support relationship with the BCT S-6.

C-3. The number and nature of these relationships require open lines of communication to prevent confusion when planning and executing signal support to the brigade. This open dialogue should include realistic assessments of the time and resources necessary to train signal teams.

C-4. Depending on conditions, additional signal enabler assets from external sources, such as an expeditionary signal battalion, may be integrated into the BCT network. This support requires direct coordination through the BCT S-6.

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Appendix D Signal Soldier Technical Certifications

SIGNAL SOLDIER TECHNICAL CERTIFICATIONS

D-1. Units must ensure that signal Soldiers operating on the network are certified prior to operating systems with advanced privileges. Signal leaders should be familiar with the certification requirements outlined within DOD 8570.01-M and AR 25-2.

D-2. The DOD CIO and Army CIO/G-6 have outlined the requirements for all civilian, military, and contractor personnel assigned to cyberspace work roles to meet qualifications standards in compliance with DODD 8140.01, AR 25-2, Army CIO/G-6 Memorandum: Privileged/Elevated Access to Army Information Systems, Networks and Data (https://atc.us.army.mil/iastar/regulations.php).

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Appendix E Certification Requirements

CERTIFICATION REQUIREMENTS

E-1. Tables E-1 through E-4 align the approved baseline certifications and IA categories with the positions outlined in the signal company table of organization and equipment. Personnel in these positions are required to obtain and maintain only one of the certifications listed as a minimum. Higher-level certifications are accepted in lieu of the baseline certifications.

Table E-1. Company headquarters baseline certification requirements

Company HQ			
POSITION	MOS	BASELINE CERT	IA Category
Primary IMO	25N30	SEC+/GSLC/CAP	IAM LVL 1
Alternate IMO	25B	A+/NET+/SSCP/CCNA-SECURITY	IAT LVL 1

Table E-2. Joint Network Node and Tactical Communications Node baseline certification requirements

JNN/TCN (Medium Network Team)			
POSITION	MOS	BASELINE CERT	IA Category
SR NODAL NET SYS OPR-MNT	25N20	SEC+/SSCP/CCNA-SECURITY/GSEC	IAT LVL 2
NODAL NET SYS OPR-MNT	25N10	A+/NET+/SSCP/CCNA-SECURITY	IAT LVL 1
NODAL NET SYS OPR-MNT	25N10	A+/NET+/SSCP/CCNA-SECURITY	IAT LVL 1
SR SAT COM SYS OPR-MNT	25S20		
SATCOM SYS OPR-MNT	25S10		
SATCOM SYS OPR-MNT	25S10		

CPN (Small Network Team)			
POSITION	MOS	BASELINE CERT	IA Category
SR XMSN SYS OPR-MNT	25Q20	SEC+/SSCP/CCNA-SECURITY/GSEC	IAT LVL 2
INFO SYS SP	25B10	A+/NET+/SSCP/CCNA-SECURITY	IAT LVL 1
INFO SYS SP	25B10	A+/NET+/SSCP/CCNA-SECURITY	IAT LVL 1
XMSN SYS OPR-MNT	25Q10		

Table E-3. Command Post Node baseline certification requirements

Table E-4. Single Shelter Switch baseline certification requirements

SSS(Large Network Team)			
POSITION	MOS	BASELINE CERT	IA Category
TELECOM OPNS CHIEF	25W40	SEC+/SSCP/CCNA-SECURITY/GSEC	IAT LVL 2
NODAL NET SYS SUPV	25N30	SEC+/SSCP/CCNA-SECURITY/GSEC	IAT LVL 1
NODAL NET SYS OPR-MNT	25N10	A+/NET+/SSCP/CCNA-SECURITY	IAT LVL 1

Glossary

The glossary lists Army, multi-Service, or joint, and other selected acronyms.

SECTION I – ACRONYMS AND ABBREVIATIONS				
AFATDS	Advanced Field Artillery Tactical Data System			
ASI	additional skill identifier			
ВСТ	brigade combat team			
BEB	brigade engineer battalion			
C&E	communications and electronics			
CATS	combined arms training strategy			
CIO	chief information officer			
CCNA	Cisco Certified Network Associate			
CNCOA	Cyber Noncommissioned Officer Academy			
CNR	Combat Network Radio			
СОР	common operational picture			
DODIN	Department of Defense information network			
EP	electronic protection			
FM	frequency modulation			
FSR	field service representative			
G-6	(Army) assistant chief of staff, signal			
HCLOS	high capacity line of sight			
HF	high frequency			
JBCP	Joint Batte Command Platform			
LAR	logistics assistance representative			
MCDMG	mission command digital master gunner			
MCIS	mission command information system			
MET	mission-essential task			
METL	mission-essential task list			
MOS	military occupational specialty			
NET	network			
PACE	primary, alternate, contingency, and emergency			
PERRY	percentage of on-hand equipment fully mission capable			
PIEMC	percentage pacing item on hand fully mission capable			
PMCS	preventive maintenance checks and services			
PNT	positioning, navigation, and timing			
RETRANS	retransmission			
S-6	(Army) battalion or brigade communications staff officer			

SAR	satellite access request
SMART-T	Secure, Mobile-Anti-jam, Reliable Tactical Terminal
SRW	Soldier Radio Waveform
SSCP	system security certified practitioner
STT	satellite transportabale trailer
T&EO	training and evaluation outline
TACSAT	tactical satellite
TRADOC	U.S. Army Training and Doctrine Command
UHF	ultra high frequency
UTP	unit training plan
VHF	very high frequency
WIN-T	Warfighter Information Network-Tactical

SECTION II – TERMS

None.

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TC 6-02.1 6 July 2018

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