

ATP 3-01.81

Counter-Unmanned Aircraft System Techniques

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Preface

Army Techniques Publication (ATP) 3-01.81 Counter-Unmanned Aircraft System (C-UAS) Techniques provides planning considerations for defending against low, slow, small (LSS) unmanned air threats during operations. This ATP also provides guidance on how to plan for, and incorporate, C-UAS soldier tasks into unit training events. This ATP offers planning guidance to brigade and below level forces when regional threat estimates include the smaller unmanned aircraft system (UAS) platforms.

The principal audience for ATP 3-01.81 is the maneuver brigade and below commanders and staff, junior leaders, platoons and individual squads who employ combined arms planning techniques within their operations. However, leaders in all deploying organizations can benefit from this supplemental information and C-UAS techniques prescribed in this publication. Additionally, trainers and educators will also use this publication to support the employment of combined arms air defense into their curricula.

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.)

ATP 3-01.81 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. ATP 3-01.81 does not prescribe any proponent terms within this publication. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

ATP 3-01.81 applies to the Active Army, Army National Guard, and United States Army Reserve unless otherwise stated.

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Introduction

The focus of ATP 3-01.81 Counter-Unmanned Aircraft System (C-UAS) Techniques is training and educating the force while assisting maneuver units in developing C-UAS Tactics, Techniques, and Procedures (TTP). It addresses exploitation of low, slow, small (LSS) UAS as an unconventional air threat and modifier to surveillance and targeting actions. Defending against UAS is a difficult task and no single solution exists to defeat all categories of the LSS threat.

Collaborative and integrated planning of sensors and warning capabilities as well as shared intelligence between echelons is essential. Coordination with air-ground integration or airspace management personnel for updated intelligence and defense support can help minimize air threat effects reducing damage and protecting personnel and equipment as well as friendly UASs operating within the area of operation. This publication consists of four chapters and one appendix concentrating on planning for an unpredictable threat environment that has the potential of coordinated attack aided by LSS UASs. The supporting appendix provides brigade and below training strategies:

Chapter 1. Operational Environment

Chapter 2. Brigade Planning Considerations

Chapter 3. Battalion Level Planning Considerations

Chapter 4. Company Level C-UAS Actions

Appendix A. C-UAS Training Strategy

Chapter 1

Operational Environment

This chapter describes an operating environment, which requires ground units at all levels to plan, coordinate, and synchronize actions to counter UAS threats. UASs have advanced technologically and proliferated exponentially over the past decade. As technology has progressed, both reconnaissance and attack capabilities have matured to the point where UASs represent a significant threat to Army, joint, and multinational partner operations from both state and non-state actors. Primary focus of this publication is to assist maneuver forces in defeating the effects of LSS UAS. This chapter discusses current force capabilities to detect, identify, and defeat threat LSS UAS capabilities.

THREAT UAS (LOW, SLOW, SMALL)

1-1. LSS UASs are slow, small, tactical-level UASs operating at relatively low altitudes. The ability to operate within such low altitudes decreases the likelihood of friendly forces detecting the threat in a timely manner. LSS UAS systems provide cost effective, high payoff means of surveillance and reconnaissance. Integrated air and missile defense (IAMD) capabilities can effectively counter larger classes of UAS but have difficulty tracking, identifying, and defeating LSS UAS. The challenge is at the brigade and below level with planning for and defending against LSS UAS threats.

1-2. Advancements in unmanned technologies allow asymmetrical approaches to conduct attacks, collect information, or trigger other threatening events. We must therefore rethink our current knowledge of our adversary's tactics concerning LSS UAS employment. This problem can escalate as UAS technologies become less expensive and more capable, accessible, and adaptable. Mass UAS employment by threat forces can produce overwhelming effects on maneuver forces.

1-3. Small units operating in and around combat areas should assume they are being observed by the enemy and not assume they are under the umbrella (protection) of air and missile defense units. Larger air threats (fixed- and rotary-wing aircraft, ballistic and cruise missiles, and group 4-5 UASs) can be detected early entering friendly areas of operations, identified, processed, and defeated. While not all hostile air threats require engagement using "active air defense measures" from air and missile defense units, there is still a requirement to find (detect, identify and be prepared to defeat) all classes of UASs. Modern sensors which includes a host of robust long-range and short-range radars, optical devices, wireless and audible alert systems face challenges detecting the LSS UAS (groups 1 and 2) at sufficient ranges to mitigate effects.

1-4. Not all encounters with unknown LSS UAS means your unit is at risk or under attack. However, spotting unidentified LSS UAS operating approximately in the unit's or forces location may be a precursor to an imminent attack. Combined arms units must react quickly and appropriately (respond and report) when recognizing signs of possible enemy observation or attack. Whether a counter response is available or not units must implement passive air defense measures to include camouflage, cover, concealment, and hardening in order to protect lives and equipment.

LOW, SLOW, SMALL UAS GROUPS

1-5. UASs are categorized into group 1 (includes mini and micro systems) through group 5 (strategic level assets). Groups are typically based on weight, operating altitude, and speed. The bigger the platform the more robust its suite of capabilities. This ATP focuses on the LSS UAS threat highlighted in figure 1-1 on page 1-2, LSS UAS threat categories.

UAS Groups 1 thru 5 (Emphasis on Low- Slow- Small Systems)		
Group 1 Micro / Mini UAS	Weighs 20 pounds or less and normally operates below 1,200 feet above ground level (AGL) at speeds less than 100 knots	These systems are generally hand launched including hobby type UAS. They offer real time video and control, and have small payload capabilities. Operated within line of sight of user.
Group 2 Small Tactical	Weighs 21–55 pounds and normally operates below 3,500 feet AGL at speeds less than 250 knots	Small airframes, low radar cross-sections, and provide medium range and endurance. Requires line of sight to the ground control station.
Group 3 Tactical	Weighs more than 55 pounds, but less than 1,320 pounds, and normally operates below 18,000 feet mean sea level (MSL) at speeds less than 250 knots	Range and endurance varies significantly among platforms. Requires a larger logistics footprint than Groups 1 and 2.
Group 4 Persistent	Weighs more than 1,320 pounds and normally operates below 18,000 feet MSL at any speed	Relatively large systems operated at medium to high altitudes. This group has extended range and endurance capabilities (may require runway for launch and recovery).
Group 5 Penetrating	Weighs more than 1,320 pounds and normally operates higher than 18,000 feet MSL at any speed	Operated at medium to high altitudes having the greatest range, endurance, and airspeed. Requires large logistical footprint similar to that of manned aircraft.

AGL above ground level MSL mean sea level UAS unmanned aircraft system

Figure 1-1. LSS UAS threat categories

1-6. UAS groups 1 and 2 are abundant and difficult to detect on the battlefield. They constitute one of the most significant threats facing friendly ground forces when integrated with indirect fire capabilities. The technological enhancements, accessibility, and economic feasibility of the LSS UAS systems makes them an area of interest for potential adversaries. Planning for threat UASs should assume within the planning process that all UAS platforms may be capable of being outfitted with a suite of capabilities. These may include intelligence, surveillance, reconnaissance, and targeting capabilities. UAS payloads may utilize some form of electro-optical or infrared optics, radar, signals intelligence, or laser designation supporting delivery of electronic warfare, air-to-surface weapons, or one-way lethal payloads.

1-7. Advancement in technology and innovation within LSS UAS development gives the smaller group 1 UAS two subcategories, micro and mini. This group consist of commercial-off-the-shelf radio controlled platforms. Due to construction, range, cost, and operation these mini or micro UAS may be operated using launch and forget tactics. This tactic allows one operator to conduct limited reconnaissance, surveillance, and intelligence gathering operations. Given that group 1 UASs are constructed using small airframes with limited range, it can be assumed that their suite of capabilities may be limited to video or still frame optics. Adding weapons to this platform, while not impossible, likely provides limited to no effects for the adversary. C-UAS planners should consider this group focuses on reconnaissance, surveillance, and intelligence gathering tasks.

1-8. Group 2 and 3 LSS UASs, while slightly larger than the group 1 versions, are constructed of small, lightweight airframes. Understanding the limitations of group 2 and 3’s construction will help C-UAS planners to understand that due to their size, range, and load bearing capacity their suite of capabilities may be primarily focused on reconnaissance, surveillance and intelligence gathering operations. Group 2 and 3 LSS UAS will have a low radar cross section, which assists this platform with evading friendly forces early warning and detection capabilities. Due to their size and logistical footprint, groups 2 and 3 may be launched in unimproved areas with a small number of personnel involved in the operations. During C-UAS planning, it may be assumed that the focus of group 2 and 3 will be reconnaissance, surveillance, and intelligence

gathering operations. The threat of adding weapons to any of these platforms must remain a consideration during C-UAS planning.

1-9. Group 4 UASs have a larger footprint and requires more logistical support. These systems require a runway to launch from and recover on, similar to that of manned aircraft. Group 4 systems tend to be larger, operate at much higher altitudes, and have an extended range over group 3. Group 4 systems are considered the first group of UASs that can be used both strategically and tactically. The suite of capabilities to take into consideration when conducting C-UAS planning for group 4 is reconnaissance, surveillance, intelligence gathering and air to surface weapon payloads. Due to its size and range, group 4 UASs have the potential to provide enough cross section and time on station for early warning and radar systems to detect and friendly forces C-UAS assets to engage.

1-10. Group 5 UASs are strategic-level assets and the largest of all groups. This UAS group requires improved runways for launch and recover operations. These UASs can be operated by relay or line of sight. When conducting C-UAS planning for group 5, consideration must be placed on the size of the payloads these platforms are capable of carrying. This may include a suite of optics that provide targeting capabilities as well as the weaponry for immediate engagement of identified targets.

FIND (DETECT, IDENTIFY, RESPOND AND REPORT) THREAT UAS

1-11. C-UAS operations, at a minimum, should include techniques to detect, identify, respond to—and report threat UAS. Considerations for executing these techniques include:

- Integrating and networking sensors to develop the enemy threat UAS situation.
- Maneuvering to provide positions of optimal observation.
- Developing and sharing the common operational picture.
- Conducting observation (air guard) actions to detect and report threat UAS platforms.
- Ensuring communications with airspace management and aviation personnel, and fires elements supporting airspace clearance and identification.
- Coordinating with higher headquarters for non-organic support such as early warning sensors, or electronic warfare capabilities.
- Establishing an immediate C-UAS engagement area (fratricide prevention).

1-12. Maneuver forces are able to access and share automated air threat information and current intelligence as quickly as it becomes available through the air defense and airspace control systems that include Tactical Airspace Integration System (TAIS), Air and Missile Defense Workstation (AMDWS), Forward Area Air Defense (FAAD) system, Advanced Field Artillery Tactical Data System (AFATDS) and Air Defense System Integrator (ADSI). Other systems include phone, chat, or email depending on capabilities and configuration. The air and threat information can be distributed using Secret Internet Protocol Router Network (SIPRNET), Data Dissemination Services (DDS), and Multi-Tactical Data Links (Link 16 [TDL-J], Link 11B, Intra-FAAD network, Situational Awareness Data Link [SADL]). Threat information should include alerting, queuing, reporting of threat launches and origins, and confirmed headings.

1-13. Multi-echelon planning, coordination and integration provides the commander and staff a common C-UAS operating picture. This common operating picture is developed based on sensor, collection, and dissemination plans.

- **Sensor Plan.** Sensor capabilities should include; radars, audible and optical devices, and human capabilities forming a seamless integrated sensor network. Sensors whether networked or not must complement the intelligence needs of the formations they support. Sensor capabilities in support of low-level air threats must be planned accordingly and coordinated in advance. Consider coordinating through higher headquarters for additional sensor capabilities.
- **Collection Plan.** Collection plans are established by the brigade and below that are equipped with organic UAS capabilities dedicated to perform reconnaissance and surveillance tasks, and intelligence operations that provide commanders' critical information requirements. The collection plan should also include the dissemination of position and flight profiles of friendly UASs to the surrounding forces to reduce the possibility of fratricide.

- **Dissemination Plan.** Dissemination throughout the area of operations needs to be coordinated in order to provide UAS information to the lowest level to include size, activity, location, direction, time, and weaponry to the lowest level. A brigade disseminates alerts, air defense warnings, airspace control measures, and weapons control status received from higher headquarters to subordinate units. For example, the air defense airspace management (ADAM) and fires cell use AMDWS or AFATDS to disseminate early warning.

1-14. Commanders must decide the best course of action (COA) during their planning and threat assessments to safeguard all forces against the LSS UAS threats.

C-UAS TRAINING

1-15. There is no single solution to countering the LSS UAS threat. Training the force to recognize and neutralize LSS UAS threats prior to an attack is definitely the preferred method but is not always feasible. If an air attack is imminent, the commander should use the most efficient method available to protect the unit and minimize effects. Combined arms forces must maintain flexibility in their options to quickly recognize and counter the effects from enemy LSS UAS.

1-16. The commander must first train his unit on LSS UAS threat capabilities, the dangers that the UAS may impose on the unit, and associated reaction drills (responses) once the UAS is spotted. Training the unit to operate while routinely employing appropriate methods of observation and reporting reduces the LSS UAS hazards. Secondly, the unit must respond quickly using the right countermeasures available to defeat or degrade effects from a potential attack. Not all enemy actions require an engagement by small arms to defeat the threat. The response could be to disperse the unit or take cover. The combined arms force must therefore be prepared to conduct operations, employing rapid and appropriate defense options, when encountering a LSS UAS and other unidentified air threats.

C-UAS PLANNING

1-17. Commanders must plan, prepare, execute, and assess their units' skills against the threat environment in which where the units will conduct operations. Passive air defense, combined arms for air defense and counter-reconnaissance tasks training should be an integral part of the units' pre-deployment C-UAS training and practices. The unit should develop and refine C-UAS training and associated troop leading procedures tailored to the expected threat environment. Individual and collective tasks should be identified, planned, practiced through live, virtual, and constructive training methods and evaluated during training exercises and rehearsals. Examples of key tasks to integrate into plans and combined arms unit training strategies and plans addressing LSS UAS threats are:

- Employ dedicated observers (conducting air guard techniques).
- Perform visual aircraft recognition training.
- Conduct air threat avoidance techniques.
- Establish a security force and quick reaction force.
- Establish an early warning organic sensor network.
- Conduct UAS reporting procedures.
- Perform cover and concealment.
- Select appropriate LSS UAS defeat mechanisms.
- Conduct hardening of unit positions.
- Perform unit recovery and reconstitution.
- Disseminate the air defense warning and weapon control status.

1-18. Ultimately, the best C-UAS defense is achieved through proper planning, training, coordination, and execution of unit training strategies. The maneuver force must plan, train, and execute operations as an integrated combined arms team employing all forms of passive air defense techniques when active air defense is limited or not available.

PREPARE FOR THE ENVIRONMENT

1-19. Once assigned a mission, commanders assess their environment to understand the units' operational requirements. Understanding the mission, threat, and other operational variables assists the commanders and staffs in developing deployment and operations plans. Knowing these conditions allows commanders to make the right decisions on unit and movement readiness, air and ground threat considerations, and unit training and integration requirements.

1-20. Friendly forces must carefully plan for the possibility of an asymmetric low-level air threat where adversaries' will conduct reconnaissance, surveillance, and intelligence gathering operations. Commanders need to know detailed, updated information updated and predictive intelligence about the threat disposition, capabilities, and intentions in order to plan and train Soldiers.

1-21. Identifying and training C-UAS tasks prior to deployment ensures a unit is prepared to execute self-defense TTP on the battlefield. Implementing a homestation C-UAS training program strengthens the proficiency of Soldiers in such self-defense TTP such as, air threat avoidance and reporting procedures.

1-22. Organizations should train Soldiers dedicated to perform observation and identification (air guard functions) to improve rapid detection and reporting of LSS UAS and other small aircraft. Commanders should also employ TTP that will help to mitigate the possibility of friendly forces becoming lucrative targets. One such TTP may be to ensure units are trained on air threat avoidance techniques. For example, the unit could use routes with natural cover or travel at night to mask its movements. Practicing avoidance TTP reduces the unit's chances of detection from the enemy and becoming targets of opportunity. For example, the unit could use routes with natural cover or travel at night to mask the unit's movements.

1-23. All units should become familiar with combined arms for air defense tasks and should incorporate this training into their deployment and readiness programs. Commanders should capitalize on every opportunity to coordinate their units' training strategies by synchronizing events and schedules with other maneuver units at home station or at Combined Arms Training Centers. All C-UAS task training should become an important part of unit leader training programs. Commanders should stress the importance of integrating C-UAS training into all planning and rehearsals, to include joint and multinational exercises. Accomplish C-UAS task training through realistic skills training and education down to the lowest level.

DEFINING THE OPERATIONAL ENVIRONMENT

1-24. Commanders at all levels have their own operational environments for their particular operations. Defining the operational environment allows the staffs to focus their planning efforts on defending against low-level air threats and assists the unit in creating an effective C-UAS training strategy.

1-25. Intelligence preparation of the battlefield provides the commander and staff with specific threat information on known enemy locations, tactics, and threat capabilities. Threat UAS information is critical and likely differs between adversaries. Making assumptions regarding threat UAS tactics may not be possible.

1-26. Brigades require information that allows them to influence the environment where their forces operate. They use this information as a basis to develop and refine their plans completing a more thorough assessment of their anticipated operation. This information assists the commander and staff in filling information gaps when making decisions concerning C-UAS planning for protection and security purposes.

PLANNING C-UAS SECURITY OPERATIONS

1-27. Planning considerations to detect, identify, respond to, and report threat UASs must address the following forms of contact: visual, direct, indirect, and non-hostile or civilian. Other forms of contact include obstacles, aerial, chemical, biological, radiological, and nuclear (CBRN), and electronic. These are addressed in FM 3-90-1(Offense and Defense Volume 1). The following paragraphs discuss security operations addressing the selected forms of contact.

1-28. Visual identification is detection by observation and confirms enemy activity. Visual identification provides intelligence and other important data for use in decision-making. Visual detection is also used to complement targeting activities such as assisting with identifying named areas of interest (NAIs) and target

areas of interest (TAIs). Visual identification and confirmation of LSS UAS is one of the most challenging tasks leaders and Soldiers may experience.

1-29. Direct contact with an LSS UAS is unlikely. However, the threat to friendly forces once the LSS UAS has been visually identified dramatically increases. Immediate action must take place in order to mitigate the threat of reconnaissance, surveillance, intelligence gathering operations, and direct attack.

1-30. Indirect contact associated with LSS UASs is more likely. Enemy LSS UAS may deploy just beyond visual range to observe and collect data on friendly positions. LSS UAS platforms are modified by their users to perform various roles. Modifications and upgrades to these UAS groups may include a suite of capabilities that will allow robust surveillance through the use of still photos and streaming video. It should be assumed that all military group 1 and 2 UASs can provide accurate ground target geolocations to threat indirect weapons systems. Most commercial UASs can provide at least rough ground positioning system locations of ground targets, sufficient for area targeting.

1-31. All contact with unidentified UASs should be reported immediately. If a unit is deployed tactically in the field and encounters UAS threats of any category it must be assumed that the intentions of the UAS are hostile, regardless of its actions. Depending on the group identified, there are actions that must be considered for each group. Visually hearing or spotting an UAS operating close to your location would indicate it is either a group 1 or 2. If visual identification and confirmation of the UAS puts it in group 1 it can be assumed there are associated enemy forces associated within close proximity of your location and to the unit. Groups 3, 4, and 5 are generally not seen or heard by ground forces after launch. Understanding the capabilities and limitations of UAS allows commanders and staff to plan for potential enemy actions associated with each group.

1-32. Once visual identification is confirmed and relayed to higher headquarters, targeting the threat or suspected launch area can commence with whatever means the commander has available. Actions against the threat, may include direct or indirect fires, with combined arms support, or by attack aviation, electronic warfare, or immediate relocation of the unit to a safer location until the threat is neutralized.

1-33. Commanders' retain discretion to investigate all sightings of unidentified threat UAS near or entering their area of operations. All planning and rehearsals must remain flexible in situations where friendly forces are additionally entering or operating in terrain that facilitates threat UAS operations.

Chapter 2

Brigade Planning Considerations

This chapter discusses brigade level planning and military decision making process (MDMP) that supports battalion and company level C-UAS efforts. This information complements the brigade's C-UAS planning considerations, commander's intent and guidance, threat environment, and standard operating procedures.

BRIGADE LEVEL C-UAS PLANNING

- 2-1. Brigade C-UAS planning starts with the commander's intent and guidance. The brigade commander and staff must make assumptions based on higher headquarters intent, timelines, possible shortfalls, and associated risk. Brigade operations order and the commanders' concept of operations are used to synchronize units' efforts, establish priorities, and identify tasks. Prioritizing efforts to defend units against an active UAS threat requires in-depth coordination with subordinate planning elements to maintain continuous early warning and require additional weapon systems coverage. This coordination may include specific sensor positioning and communications requirements.
- 2-2. Brigade planning establishes procedural rules for operations and coordination of friendly air operations efforts for air and missile defense, airspace management and control, and collaboration and dissemination of an integrated air picture, airspace coordination, sensor integration, and clearance procedures.
- 2-3. To make sound and timely decisions commanders and staff must be forward-looking, seeing themselves and other friendly forces, the terrain, and the threat. Effective commanders and staffs use integrated technologies such as organic sensors, UASs, unit standard operating procedures, and TTP to confirm and share a common operating picture. This shared common operating picture, in turn, enhances situational understanding concerning the terrain, the threat, and friendly forces. High-speed sharing of a common operating picture and other relevant information ensures that commanders and staffs make timely C-UAS decisions and their forces are able to expeditiously act upon these decisions.
- 2-4. Developing C-UAS planning considerations for a low-level UAS air threat requires the commander and staff to tailor air defense measures to meet this threat.

BRIGADE LEVEL PLANNING CONSIDERATIONS

- 2-5. The brigade develops operational plans based on orders received from higher headquarters. The commander and staff will use intelligence preparation of the battlefield (IPB) and the MDMP to understand the threat UAS problem and develop courses of action to address C-UAS. IPB is the systematic, continuous process of analyzing the threat and environment in a specific geographic area (ATP 2-01.3). The MDMP process is designed to minimize risk and assess all critical aspects of the operation, and assist commanders and staffs with thinking critically and creatively while planning. This process results in a detailed warning order, operations plan and operations order. For further information concerning the MDMP see FM 6-0, chapter 9.
- 2-6. C-UAS planning should be tailored to the mission as well as the environment. The staff monitors higher and adjacent units command operations to assess impacts to the brigade's future operations. Brigades coordinate planning estimates and functions with higher headquarters, airspace control elements, and fires cell personnel. The commander tasks his staff to monitor and control current brigade operations, conduct detailed analysis of the threat and builds future operational and security plans consistent with higher headquarters objectives.
- 2-7. Brigades establish C-UAS plans to sustain operations, security, and protection efforts of friendly forces operating in their area of responsibility. Brigades direct positioning of assets, plan sensor coverage, and

conduct movement of forces consistent with higher headquarters plans and objectives. This includes any changes to priority tasks and security of defended assets. Design the brigade's C-UAS strategy for redundancy and early warning.

2-8. Brigade planning considerations should include reporting techniques, positive identification, alert dissemination, and rules of engagement. Brigade C-UAS planning considerations are:

- Refine defended asset list based on IPB, risk and commander's assessment.
- Define the UAS rules of engagement (hostile criteria/hostile acts).
- Disseminate weapons control status (can be different for UAS, fixed-, or rotary wing).
- Establish the level of control.
- Determine the identification authority.
- Determine the engagement authority (lowest level).
- Inform Soldiers of C-UAS criteria.
- Establish general and local air defense warnings (based on running estimates of the air threat).
- Coordinate coverage that may extend beyond the brigade's organic sensor capabilities.
- Coordinate with friendly mission command nodes and airspace users to reduce fratricide.
- Establish notification procedures.

BRIGADE C-UAS APPROACH

2-9. The brigades' C-UAS approach should act as a driver for subordinate unit planning and training efforts. This planning identifies threat UAS trends using updated threat estimates and lessons learned information regarding adversary UAS activity and capabilities. Use this information as a basis to develop brigade and below planning and training.

2-10. Brigade C-UAS planning should focus the staff and other key personnel on integration and coordination tasks between higher headquarters airspace management and control elements such as fires cells and aviation personnel.

PROCEDURAL CONTROLS

2-11. C-UAS planning establishes controls within the brigade security areas. Airspace coordination measures and fire support coordination measures are examples of controls routinely activated to manage air traffic and ground movement clearances in and around the brigade's area.

2-12. Brigades must set conditions allowing forces at all echelons to recognize and report airspace violations and confirmed enemy action that occur within their area of operations. Brigade planning must include current threat sets and standardized reporting guidance. Reporting information for C-UAS activities must be standardized (see Figure 4-1, example of recommended spot report). This information should include, model, capabilities, and flight profiles. Unit standard operating procedures may include model and capability profiles found within LSS UAS groups 1, 2, and 3. These profiles will provide C-UAS planners with the suite of capabilities associated with each group.

2-13. Flight profiles associated with threat UASs can assist brigade C-UAS planners in planning for a specific LSS UAS threat. This can assist in conducting unit-specific C-UAS TTP. Timely detection of LSS UASs can determine its flight headings and travel calculations (flight profile).

2-14. Detection of threat UAS by organic sensors or through observation can assist in determining its model and flight path. Calculating speed, heading, and knowing the threat UAS's endurance based on flight profiles improves a unit's chance of mitigating the UAS's ability to conduct reconnaissance, surveillance, intelligence gathering operations, and execute attacks on friendly forces. Observers (air guard) must be familiar with LSS UAS capabilities, recognizing behaviors and patterns. Provide observers (air guard) reports to brigade planners in order to continuously update and develop evolving defenses against threat LSS UASs.

BRIGADE SENSOR PLAN

2-15. The brigade should design a sensor plan that provides units' with optimal coverage and early warning capabilities across the battlefield. Sensor planning is tailored to the circumstances surrounding the operational environment and is not limited to sensors such as radars or other electronic devices. A sensor plan supports the commanders' objectives and is networked and integrated across echelons.

2-16. Brigade sensor plans establish a seamless synchronized and coordinated network that collects information from all available sensor feeds and develops targetable data. Coordinating C-UAS sensor plans provides units the ability to complement command objectives and contributes to early warning, alert, and defense against air threats. To detect, track, and identify LSS UASs, sensor planning considerations must include:

- Target saturation effects on sensor.
- Ability to distinguish from nonmilitary threat platforms.
- Ability to distinguish friendly UAS platforms.
- Adversarial use of potential decoys.
- Ground clutter and interference.
- Planning coverage for complex terrain and adverse weather conditions.
- Sensor operator training and confidence.
- Quick resolution of detections.

BRIGADE MISSION COMMAND

2-17. Brigades are equipped with digital mission command systems to receive, process, and distribute threat information and other intelligence associated with the headquarters command posts. Mission command systems equipment typically available to a brigade are; ADSI, FAAD, TAIS, AFATDS, and a host of radios and networking equipment.

2-18. Mission command functions include sending and receiving voice and data used for mission orders, control orders, planning updates, targeting, deconfliction and clearance of airspace. The brigade mission command system establishes and validates common user networks referred to as the common operational picture and air ground integration network.

BRIGADE AIRSPACE CONTROL WORKING GROUP

2-19. Brigade mission command also consists of elements, referred to as the Airspace Control Working Group, that interface with the brigade command and common user network through various controlling authorities. The Airspace Control Working Group consists of the following personnel or staff representatives:

- Brigade Aviation Element (BAE).
- ADA cell.
- Fires cell.
- Tactical Air Control Party (command post).
- S-2 (Intel/Reconnaissance/Surveillance).
- S-3 Brigade operations cell (Battle Management Officer).
- Brigade/Battalion liaisons.
- Company commanders and staff.

2-20. Brigade Aviation Elements perform plan and coordinate aviation support for brigade operations. They also provide employment TTP when UAS and rotary-wing assets are requested for mission support. This section performs brigade standardization of UAS coordination and employment.

2-21. The ADAM cell performs mission command for brigade airspace operations. This includes operational planning and execution functions for deconfliction of airspace, air and missile defense, C-UAS, and Counter- Rockets, Artillery and Mortar defense. The ADAM cell is responsible for low-level air threat sensor employment and tasking, and production of an integrated air picture.

2-22. The fires cell plans, coordinates, integrates, synchronizes and deconflicts the employment and assessment of fires for both current and future operations. The fires cell integrates the fires warfighting function into BCT operations and is generally organized with a fire support officer (FSO) and assistants, an ADAM/BAE, an electronic warfare element, a targeting element, and digital systems operators. The Air Force Tactical Air Control Party (TACP) typically collocates with the fires cell. The fires cell plans, prepares, coordinates and integrates the execution and assessment of fires by artillery, mortar, radar, electronic attack, air support, naval surface fire support, and other joint assets.

2-23. The TACP provides planning expertise on the capabilities of air operations. This element assists with brigade planning and integration efforts during air and ground operations by coordinating tactical control of close air support.

2-24. S-2 section is responsible for coordinating the collection, reporting, and dissemination of combat information and targeting data. The S-2 has access to higher-echelon intelligence products that may provide detailed, current information regarding threat UASs that can greatly improve the brigade's offensive and defensive posture. The Tactical Intelligence Officer located in the S-2 provides current threat assessments identified during reconnaissance and friendly vulnerabilities to enemy intelligence collection systems.

2-25. Brigades integrate with lower echelon units through the common user network established throughout their battle area. These links tie the brigade to subordinate and higher headquarters mission command elements for dissemination of early warning, alerting, and coordination of targeting. The mission command network integrates battle managers with the fires cell, command post personnel and operators at the firing units.

PASSIVE DEFENSE

2-26. Enemy observation from LSS UASs and attacks may occur at any time the enemy has the ability to observe friendly movements. Enemy action is not limited to daylight hours. UAS possess the capability to operate in low light conditions as well. As such, all units must develop and employ passive defense measures at all times to defend against threat UASs.

2-27. Passive defense measures are employed to deceive enemy observation. Passive measures include camouflage, cover, concealment, and hardening (locating units on prepared sites). Other examples are moving units at night, noise and light discipline, and employing obscuration techniques.

PASSIVE MEASURES FOR C-UAS

2-28. Combined arms forces and small units should be ready to employ passive defense measures to protect themselves from detection, observation, and attack. Passive defense measures decrease the effectiveness of enemy attacks using UAS against friendly forces and their assets.

2-29. Brigades must train their forces to avoid direct and indirect attacks from air threats. Two key combined arms for air defense tasks brigades should train are damage-limiting and attack avoidance measures. Employing these measures can limit the damage of effects from detection by threat UASs.

2-30. Damage-limiting and attack avoidance measures are passive defense measures that are used to avoid detection from aerial threats and limit damage if attacked. Units must use caution when exercising C-UAS passive measures. Commanders should select positions of advantage that provide concealment for Soldiers, equipment, and unit activities. Units should avoid activities that cause excessive changes in appearance to their operational area.

ATTACK AVOIDANCE

2-31. When planning damage-limiting and attack avoidance measures brigades should consider, and subsequently training their forces on the following passive defense tasks:

- **Operate at night or during limited visibility.** Affects threat UAS observation but also limits the brigade's operational support. You must assume that the enemy has the capabilities to conduct limited visibility or night operations. Brigades and lower echelons need to ensure proper training

is conducted during hours of limited visibility. Practice light restrictions and discipline during times of limited visibility and night operations.

- **Disseminating early warning of air threats to the lowest echelon.** Early warning from the brigade to the lowest echelons is essential to countering the LSS UAS threat. Upon detection and classification of enemy UASs, the brigade must relay alert information on locations, altitudes, and time to surrounding ground forces. This information will be vital to the ground forces protection and the possible capture of the LSS UAS and its ground platform.
- **Practice good Operational Security.** Operational security is essential part of the brigades planning process. Commanders and leaders must enforce their units' operational security measures at all times. A unit must implement countermeasures immediately upon detection of an enemy UAS. Practicing good operational security will safeguard critical information and reduces the unit's vulnerabilities to enemy collection efforts. Developing and employing basic countermeasures (TTP) such as; limiting the times or amount of forces exposed to possible aerial observation, or minimizing organized unit activities until the threat is neutralized or destroyed should be considered.
- **Use Emission Control to limit electromagnetic and acoustic footprint.** The selective and controlled use of electromagnetic, acoustic, or other emitters to optimize mission command and controlling capabilities while minimizing operations security. The controlled use will also mitigate: a) detection by enemy sensors; b) mutual interference among friendly systems; c) enemy interference with the ability to execute a military deception plan.
- **Use camouflage and concealment.** Camouflage is the use of natural or artificial materials to disguise personnel and/or equipment. Concealment is used to reduce the factors of recognition. Hiding, blending, and disguising are some techniques of concealment.
 - **Hiding.** Hiding is the concealment of an object by some form of natural or man-made screening.
 - **Blending.** Blending is the arrangement or application of camouflage materials on, over, and around the object so that it appears to be part of the background.
 - **Disguising.** Clever disguises can often mislead the enemy concerning identity, strength, and intention, and may draw fire away from real assets.
- **Use decoys and deception.** Using such things as decoys to set up false locations, with smoke to draw attention away from an operation, or emitters and emulators to confuse collection activities can conceal unit activities from enemy detection.
- **Hardening.** Use protective construction and overhead cover to provide damage-limiting cover for friendly forces and equipment. The hardening and fortifying of cover will limits the threat UAS's ability to visually see and limit the damaging effects of an aerial attack.
- **Use of obscurants.** Use optical and noise reducing measures to limit the glare or noise of equipment. Placing mud on headlights and using camouflage nets to obscure the glare of windshields with prevents friendly forces from drawing attention to their position. Using noise blocking barrier and foam will lowers the noise of operating equipment.
- **Unit Dispersion.** Disperse assets to minimize detection and damage if attacked. Dispersion may be your best damage-limiting measure. Proper dispersion of your unit and equipment lessens target density and reduces the lethal effects of the ordnance used against you. Area weapons become less effective when units disperse.
- **Maintain vigilance.** Friendly forces must assume they are always vulnerable to enemy targeting attempts. This is especially true when conducting convoys for troop movements or performing supply actions and as they move through open areas or concentrate at choke points along the convoy route.
- **Establish early warning network.** Establish an air defense early warning network using the radios and digital networks that are assigned to the brigade command post. Ensure that supported units have trained and assigned personnel to monitor these networks and radios at all time.
- **Disseminate early warning.** Automated early warning of air threats should be disseminated throughout the brigade's common user network down to the lowest echelons. Ensure that

supported units know the current air defense warning for the area of operations, local air defense warnings for the brigade, and current weapon control status.

ACTIVE DEFENSE

2-32. Brigade active defense planning considerations include training, integration and employment of defeat capabilities to effectively neutralize or destroy air threats within an area of operations. Conducting proactive training prepares units to respond using the right countermeasure against the threat. Early detection and reporting of suspected enemy air threats including LSS UAS activity must be reported immediately. Well-rehearsed and executed countermeasures should be included in unit operating procedures.

Note. Active air defense is described as the direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile air and missile threats against friendly forces and assets. (FM 3-01)

2-33. Brigades are responsible for planning and training C-UAS active defense measures for their subordinate units. Brigade active defense training should teach battle managers and other operations personnel to report all detections, coordinate engagements of suspected threat UASs, and respond to confirmed UAS detections using limited offensive actions or counterattacks as necessary to protect themselves from direct or indirect attacks.

ACTIVE DEFENSE PLANNING

2-34. Active defense plans should be coordinated with airspace managers and air defense personnel. These plans should consider the use of air defense weapons, small arms weapons, electronic warfare, and any other assets available to the brigade that can detect and mitigate hostile aerial platforms.

2-35. Active defense planning measures taken in support of the mission must adhere to the commander's ROE and consider potential collateral damage associated with the weapon system and to the surrounding area. Early detection and defeat of threat UAS also increases the chance of capturing or destroying both the threat UAS and its ground station.

ACTIVE MEASURES FOR C-UAS

2-36. Brigades should coordinate active measures with higher and lower echelon units operating within the area of operations. This includes planning, training and equipping units to conduct active measures. Active measures for combined arms units must include basic rules that assist the brigade in the identification and defeat process for threat UASs. For example, establish standard operating procedures for disseminating weapons control status and hostile criteria. Brigades should consider training their forces on the following active measures:

- **Define characteristics for threat UAS.** Factors for defining the characteristics of threat UASs are speed, altitude, location, and heading within the brigade's airspace.
- **Develop and transmit weapon control status.** Weapon control status is a control measure designed to establish procedures for forces using surface-to-air weapons (including small arms weapons) to engage threats. Weapon control statuses can apply to weapon systems, volumes of airspace, or types of air platforms. This includes established restricted and engagement zones. Categories of weapons control status are:
 - **Weapons-Free.** Indicates that weapons systems may fire at any target not positively identified as friendly. This is the least restrictive weapon control status.
 - **Weapons-Tight.** Indicates that weapons systems may only fire at targets identified as hostile in accordance with current rules of engagement.
 - **Weapons-Hold.** Indicates that weapons systems may only fire in self-defense or in response to a formal order. This is the most restrictive weapon control status.
- **Develop comprehensive air IPB.** Update IPB to maintain running estimates to determine threat UAS activity and patterns.

- **Establish rules of engagement.** Commanders must establish and disseminate rules of engagement for encountering threat UAS (see ATP 3-01.8). The first three rules of engagement categories are applicable to all combined arms forces while the others are primarily for air and missile defense forces. These are:
 - Right of self-defense.
 - Identification criteria.
 - Weapons control status.
 - Levels of control.
 - Modes of control.
 - Autonomous operations.
 - Fire control orders.
- **Sensor planning.** Develop and coordinate integrated sensor plans to detect all low-level air threats including LSS UASs.
- **Integrate sensors.** Integrate a variety of available sensors and signal intelligence/cyber assets to detect, identify, and confirm threat UASs, ground control stations, enemy hide points and assets.
- **Identify NAIs and TAIs.** Place enemy UAS activity on the targeting priority list.
- **Use observers (air guard):**
 - React to threat UASs by determining distance and bearing to the threat and take pictures if possible.
 - Immediately report sightings of threat UAS (Spot Report) as prescribed by the unit's standard operating procedures.
 - If observer (air guard) position and personnel become threatened, respond in accordance with established unit TTP that could include moving to alternate positions, engaging the threat UAS with small arms using combined arms for air defense firing techniques, and requesting engagement support with air and missile defense weapon systems and aviation assets.

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Chapter 3

Battalion Level Planning Considerations

This chapter discusses battalion-level planning as it pertains to potential UAS threats. Planning for threat UASs supports the efforts of battalion level commanders and staff to an adversary's ability to gain a tactical advantage.

BATTALION C-UAS PLANNING

3-1. Battalion C-UAS planning begins with the commander's intent. The battalion commander's intent, formalized as an order and understood down to the company level, provides subordinates with the broad idea behind the C-UAS operations and allows them to act promptly as the situation requires. Subordinate commanders may then focus on the task of mitigating the threat UAS as a whole rather than the details.

3-2. Planning, preparing, executing, and assessing should occur continuously in C-UAS operations. Throughout this process, the commander and staff should continuously analyze the threat UAS situation and prepare running estimates. An effective running estimate will enable the staff to determine if the C-UAS operation is proceeding according to the commander's intent and if future operations are supportable.

3-3. The battalion develops a C-UAS strategy based on intelligence estimates and analyses. This strategy should focus assets, resources, and expertise to effectively mitigate LSS UAS threats. Assessments on enemy capabilities and trends, operational gaps, and command priorities should also be included in the C-UAS strategy, enabling the battalion to plan for mitigating LSS UAS threats. The battalion staff should ensure that all subordinate unit C-UAS plans are nested with the battalion C-UAS strategy.

3-4. It is essential for the battalion staff to have situational understanding of the dynamic C-UAS planning environment. Understanding the dynamics of the environment helps the unit successfully adapt to the special requirements and considerations for C-UAS operations. Considerations include:

- Is the current weather or forecasted weather going to affect the enemy's ability to conduct UAS reconnaissance, surveillance, and intelligence gathering operations on friendly forces?
- Are there any terrain issues that would affect enemy launch and recovery operations?
- What is the pattern of activity associated with adversary UAS operations?
- Are there any civilian infrastructures in the area of operations that can provide the enemy with cover and concealment?
- Does the battalion have any assets that can deter enemy UAS use?
- What is the current UAS threat assessment?

3-5. Threat assessment, commander's intent, mission analysis, and other information related activities are used to develop the battalions C-UAS course of action. The commander and staff should refine their C-UAS course of action by weighing possible scenarios against specific threats, considering organic assets, supporting assets, and other resources available to the battalion.

3-6. A threat assessment is conducted to understand how an adversary can affect friendly operations. The threat assessment, specifically, provides the battalion staff with an understanding of UAS characteristics and capabilities, identifies any special areas of interest in which UASs would likely operate, and notes any staff concerns regarding UAS operations. The threat assessment assists with developing a battalion's course of action to deal with the threat. Command priorities, planning, and coordination requirements drive employment of active or passive C-UAS measures.

3-7. Battalion level planners assisting with a C-UAS course of action must take into consideration:

- Possible threat UAS groups operating in battalion area of operations.
- Capabilities of threat UASs.

- Number of threat UASs expected in area of operations.
- Payload capabilities.
- Early warning and radar evading capability.
- Flight profiles.
- Sensor coordination with higher headquarters.

3-8. The purpose of conducting a threat assessment is to understand how an adversary can affect friendly operations. A thorough threat techniques assessment by the battalion staff for mitigation of LSS UASs should be implemented and pushed down to the company level for execution. Execute these techniques during battalion mission rehearsals.

BATTALION C-UAS APPROACH

3-9. Battalion level planners must integrate and synchronize training, technology, and resourcing solutions into the battalion C-UAS approach. This integration and synchronization will assist commanders and staffs in identifying capability gaps and the corresponding solutions involved.

3-10. A technique for the identification of capability gaps and creating a solutions is to conduct C-UAS rehearsals. Conducting C-UAS rehearsals may help to better understand the requirements needed to mitigate the UAS threat at battalion and below levels. Incremental adjustments to the C-UAS strategy may be identified and accounted for during rehearsals. These adjustments may translate into additional planning guidance from the commander in order to clarify any confusion as to the intent concerning LSS UAS mitigation.

3-11. C-UAS rehearsals at the battalion level may include:

- Prepare soldiers and leaders to understand that C-UAS activities require timely and actionable spot report procedures.
- Integrate battalion and below organic sensor capabilities into brigade and above sensor plans and C-UAS operations.
- Provide commander's guidance on threat UAS identification criteria and authority to classify.
- Established communications link for the C-UAS battle drills with Soldiers at every level in the battalion.

PLANNING ENABLERS

3-12. Battalion and below units should coordinate their sensor needs with their higher headquarters. At battalion level, there are limited organic sensor capabilities that may assist with C-UAS operations. However, to conduct a successful C-UAS operation, the battalion commander and staff must have access to information that address current and emerging UAS threats. Accessing sensor capabilities from brigade and even echelons above brigade can assist the battalion staff in identifying gaps in the C-UAS strategy and help to provide C-UAS operations management through any phase of the conflict.

3-13. The initial step in providing for the identification and grouping of threat UASs begins with accurate and timely spot reporting procedures. These procedures may be conducted through Soldier reporting for group 1 and 2 UASs, or current systems may be augmented to detect, track, and identify larger high-flying group 3 and 4 UAS. Although digital sensor systems may be configured to detect, track, and identify LSS UASs, the data is usually filtered out to avoid operator overload, reduce clutter, and diminish false target generation. Focus operators to look for LSS UAS signatures by implementing appropriate battalion sensor capabilities and adjustments during battalion rehearsals.

3-14. Training is required to ensure C-UAS capabilities are understood and used to the best of the unit's ability. Proper mission analysis and home-station staff training are paramount in creating the appropriate structure and TTP that are capable of mitigating the UAS threat. Rehearsals and understanding reporting procedures are necessary to ensure commanders and staffs have the relevant information to conduct successful C-UAS operations, thereby limiting the enemy's ability to inflict damage on friendly forces.

Chapter 4

Company Level C-UAS Actions

This chapter provides guidelines to assist company level commanders in developing C-UAS techniques. It discusses actions to take when anticipating or encountering possible UAS threats while on the battlefield.

COMPANY C-UAS APPROACH

4-1. The adversary's use of commercial-off-the-shelf technology to gain a tactical advantage compromises our ability to conduct operations without revealing our intentions and making ourselves vulnerable to attack. In order to counter this low-level air threat US forces must ensure that our lowest level sensor, the Soldier, is appropriately trained and equipped. This begins at the Company level.

4-2. When exercising mission command, the company commander assisted by the platoon leaders may use a variety of techniques to prepare for missions, employ the company, communicate, and issue orders. Company commanders must have an understanding of the tasks relative to C-UAS operations. This understanding should translate into a quick reference guide or pre-combat checklist to focus the company on C-UAS.

4-3. A technique that may be established at company level is to identify Soldiers to act as observers (air guard) throughout all phases of the operation. Platoon leaders should conduct technique rehearsals to plan observer (air guard) tasks, locations, discuss UAS spot report procedures, and communication plans.

4-4. Company level security operations are complemented by employing observer (air guard) techniques. An observer (air guard) may assist with mitigating the threat UAS' capability to conduct reconnaissance, surveillance and intelligence gathering operations and execute attacks on friendly forces.

4-5. Units must avoid detection and observation from LSS UAS. If LSS UAS is observed over your position, it is likely your position is already compromised. Units must attempt to engage and destroy the UAS using any organic means available, typically small arms fires organic to the unit while simultaneously relocating the unit.

OBSERVER (AIR GUARD) TECHNIQUES

4-6. Assigned personnel for observer (air guard) duties need to be vigilant, eyes on the horizon. Observers (air guard) will perform actions such as search and scan techniques for approaching threat UASs while observing their assigned sectors (see Figures 4-2 and 4-3 on page 4-3, Observer scan techniques). Early warning is the key for observers (air guards) since it is their job to alert the formation of any possible air threats. Sector limits must cover likely avenues of approach for threat UASs; scan the roof tops of surrounding buildings or trees that might be used to provide cover or concealment.

4-7. Reporting threat UAS activity should include an estimate of the threat(s) location from the observer's (air guard) position. This information should include reference points based on known locations, for example, the observers (air guard) position, a friendly unit's grid coordinates, or major terrain feature. Using this method can assist others in accurate locating and targeting. The observer (air guard) reports the approximate distance, time, duration, size, estimated elevation, and direction the UAS was heading when detected. If UAS group 1 is spotted, the observer (air guard) should immediately be on alert to identify any possible threats in close proximity, to include enemy ground troops or control teams. When spotting a micro/mini UAS, compromise of the observer (air guard) position is possible.

4-8. Reporting of a threat UAS should utilize a standard reporting format. This ensures all Soldiers understand the process and information required to conduct an enemy UAS spot report. Routine reporting

allow units time to quickly adjust force protection measures and coordinate immediate response to UAS threats. Unit C-UAS TTP must be tailored to the expected threat environment in their respective areas of operation. See Figure 4-1 for an example of a spot report format for threat UAS reporting.

Line	Information Example	Example
1	Unit call sign and frequency	Red 1, FHXXX
2	Unit location	6 to 8 digit grid coordinate
3	Location of threat UAS	Grid or distance and direction from reporting unit location
4	Time threat UAS asset spotted/detected	DTG: 091024ZMAR16
5	Estimated time on site	Was threat UAS asset approach observed or was it spotted overhead? How long might it have been there?
6	Flight characteristics	Is threat UAS loitering in one spot (possibly already spotted reporting unit), is it flying straight (enroute to loitering location), what is the direction of flight, or is it flying randomly (searching)?
7	Estimated size, elevation, and physical description	Wingspan, height, color, tail configuration, other distinguish markings.
FH frequency hop DTG date, time, group UAS unmanned aircraft system		

Figure 4-1. Recommended threat UAS reporting format (Spot Report)

4-9. Company commanders and platoon leaders should ensure the unit’s location and perimeter security operations includes trained observers (air guard) to aid the unit’s defenses in areas where threat UASs are known to operate. Soldiers performing as observers (air guard) should establish positions within visual range of the unit (between 500 meters and 1.5 kilometers). This should allow the observer (air guard) to see, hear, and report potential threats.

4-10. Observers (air guard) should have the ability to conduct all operations under all conditions such as; day, night, and limited visibility. Observers (air guard) should be equipped with the necessary optical gear to perform search and scan techniques to reduce the enemy’s ability to evade detection. The following figures illustrate the observer (air guard) search and scan methods. Figure 4-2, on page 4-3 represents observer (air guard) vertical scan and Figure 4-3, on page 4-3 represents horizontal scan.

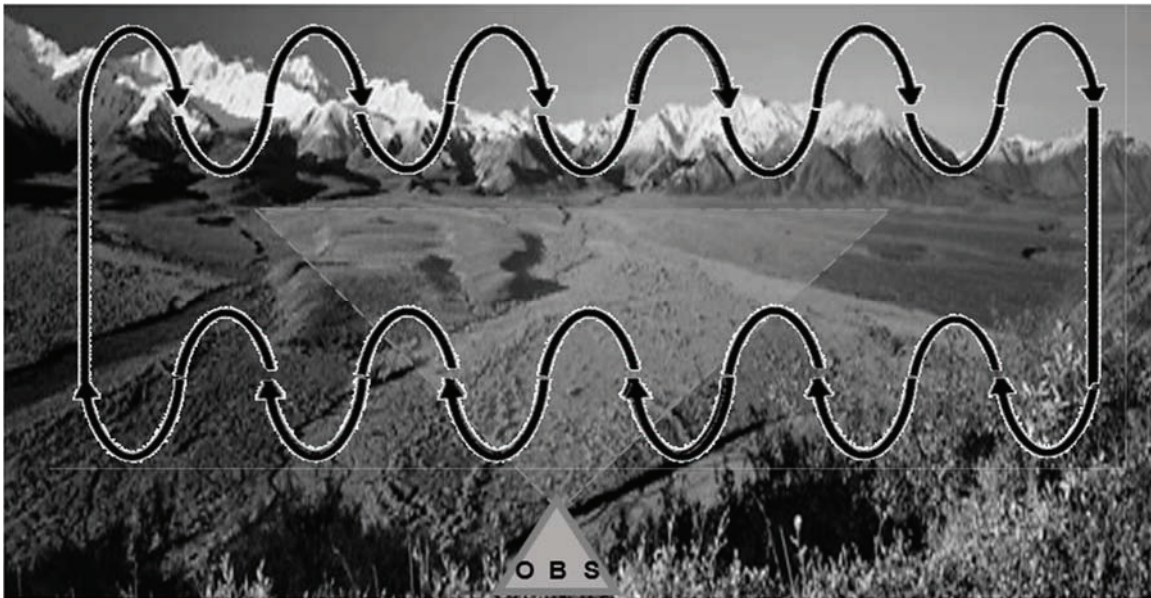


Figure 4-2. Observer (air guard) vertical scan technique

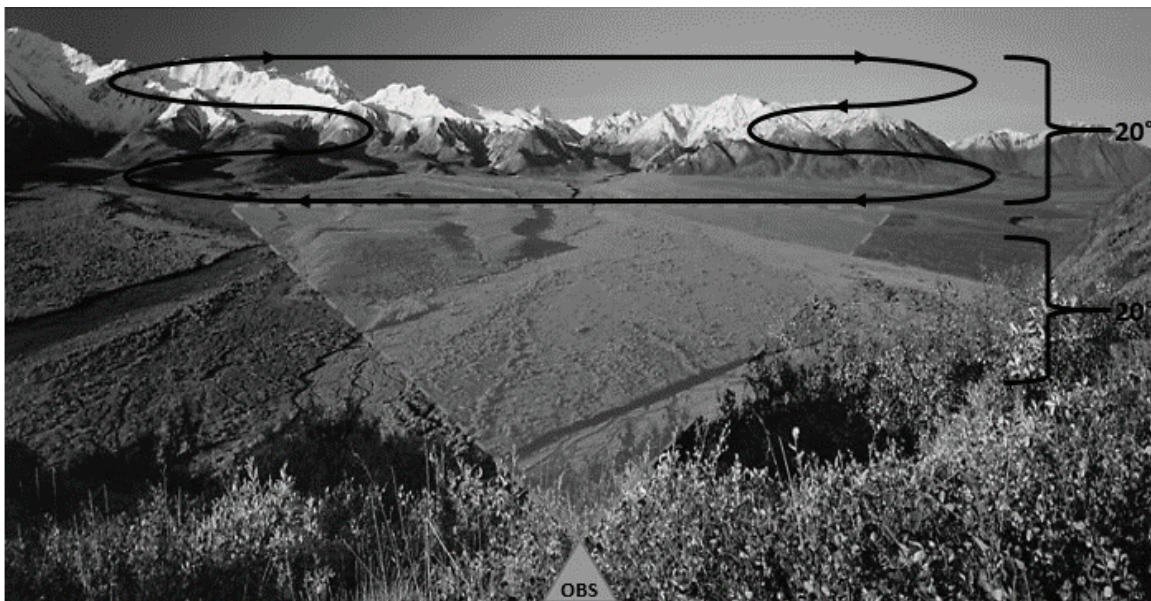


Figure 4-3. Observer (air guard) horizontal scan technique

4-11. Understanding how to apply C-UAS observation techniques enhances the observers (air guard) reaction and reporting time increasing survivability. Observers (air guard) proficient in applying terrain analysis and resection (map reading) techniques may be able to determine probable enemy launch locations using the direction of the LSS UAS's approach.

4-12. Commanders and platoon leaders must conduct rehearsals to train and educate observer (air guard) personnel on their specific responsibilities and standard operating procedures for reporting the LSS UAS threat. Rehearsals will provide company commanders the ability to make any needed changes and verify the suitability of personnel to conduct observer (air guard) techniques.

4-13. The company commander should consider planning for redundancy in positioning observers (air guard) when conducting C-UAS operations. The need for redundancy may be dictated by the terrain, threat

assessment, or overall importance of the mission. Observer (air guard) redundancy ensures sustained observation enabling the unit to continue the mission if the enemy compromises some observer (air guard) positions.

OBSERVER POSITIONING

4-14. Position observers in in-depth or linear positions (see figure 4-4 below and figure 4-5, on page 4-5). Observers placed in-depth can be configured as completely vehicle-mounted observers (air guard), dismounted observers (air guard) forward of the vehicle, or a combination of dismounted observers (air guard) and wheeled observers (air guard). In-depth observer (air guard) placement allows the company to observe their entire sector. This method works well when the company has assigned platoons their sectors that may contain terrain that facilitates multiple UAS avenues of approach, is heavily vegetated, or contains civilian infrastructure that provides the enemy with cover and concealment. In-depth placement allows for redundancy in observation and better interlocking coverage of the sector. Linear placement is effective when the enemy is not moving and provides optimum observation of the enemy.



Figure 4-4. Observer positioning in-depth



Figure 4-5. Observer positioning linear

4-15. The challenge for commanders at all levels is integrating available resources during the planning process to ensure the effective utilization of resources during mission execution. Basic planning methods and concepts, including the MDMP and troop leading procedures, are no different from those that are used throughout the Army, including the MDMP and troop leading procedures. Commanders should note that advancements in commercial-off-the-shelf technology continue to present challenges at all levels for planners conducting C-UAS operations.

C-UAS OBSERVER (AIR GUARD) CHECKLIST

4-16. Based on threat activity and mission tasks relative to C-UAS observers (air guard) should consider developing quick reference or pre-deployment and combat checklists to focus the team on C-UAS. The checklist should be available through standard military digital devices or in hardcopy form and include:

- Current UAS trends (type classification).
- Specific data on local air threats and named areas of interest.
- Secure radio operations and frequencies.
- Unit call signs to request support (quick reaction force or reconnaissance and intelligence collection support).
- Military map of area.
- Binoculars and night vision devices.
- Orientation techniques (location, heading, speed, and line-of-sight).
- C-UAS spot report.

4-17. Team leaders should conduct rehearsals to plan locations and discuss contingency, emergency and recovery operations if needed. Rehearsals can assist observer (air guard) personnel with time to address their specific responsibilities and conduct equipment-testing operations. They can perform function checks on all equipment and ask questions prior to employment. Walking to desired locations during a rehearsal helps the observer (air guard) establish the amount of time it takes to reach the unit if attacked.

4-18. Positioned observers (air guard) should conduct frequent liaison (status reporting) with the unit's command post to establish call-in procedures for communications, incident reporting, and sustainment.

ACTIVE AIR DEFENSE TECHNIQUES FOR ENGAGING UAS

4-19. Commanders have the responsibility to take whatever action is necessary to protect their forces and equipment against attack and ensure their Soldiers operate in accordance with established rules of engagement. Engagement authority for LSS UAS is delegated to the Soldier to execute air defense engagements.

4-20. Soldiers encountering groups 1 and 2 UAS should consider these as threats eligible for engagement unless positively identified as non-threatening. LSS UAS can fly extremely low underneath traditional radar detection zones. They fly very slow and can even hover in place preventing current sensors from detecting them. They are very difficult to defeat using direct fire weapons. Current air defense systems and aircraft can effectively counter UAS groups 4 and 5.

COMPANY LEVEL TROOP LEADING PROCEDURES

4-21. Company-level troop leading procedures must address C-UAS from the tactical training perspective. Proper training by small unit leaders helps ensure the unit understands the threat and employs adequate force protection measures to counter the effects of LSS UAS.

4-22. Company training should address C-UAS as part of their pre-deployment and annual training requirements. This includes review of units' training plans that include collective and individual C-UAS training tasks and subtasks. These tasks and subtasks should support:

- Friendly and hostile LSS UAS scenario lane training.
- Observation and reporting of UAS threats.
- Active defense techniques for LSS UASs.
- Inclusion of friendly UAS activity in the mission briefing.

Appendix A

C-UAS Training Strategy

This appendix aids trainers in preparing and conducting C-UAS training for the Soldiers. The training strategy involves the overall concept of integrating resources into a coherent joint program that trains individual and collective skills needed to perform C-UAS tasks. This strategy focuses on the development of critical soldier skills and leader skills that are required to detect, identify, and defeat threat UAS through a combined arms approach.

C-UAS TRAINING COMPONENTS

A-1. C-UAS training strategy must focus on critical skills in combined arms training that are adaptable to all echelons across the force. C-UAS training should be taught in the following components:

- During initial training to familiarize Soldiers with UAS threats and how to identify signs of enemy activity associated with the threat.
- During sustainment training conducted at the unit to prepare for tactical operations.
- Integrated into combined arms training exercise for reporting and airspace coordination.

A-2. Initial training is critical in developing long-term Soldier skills. Initial training educates the combined arms force on understanding how to recognize and defend against threat UAS. Initial C-UAS training should focus on the categories of unmanned and remotely piloted systems, current low-level manned and unmanned air threats, combined arms passive, defensive measures, air defense countermeasures, offensive engagement actions, and unit reporting TTP.

A-3. Sustainment training is required to develop a more comprehensive combined arms training and evaluation strategy for the unit's collective tasks. Sustainment training prepares Soldiers to perform their individual and unit collective tasks to support mission objectives. Sustainment training teaches Soldiers and crews how to conduct C-UAS operations of detect, identify, respond to—and report threat UASs as a cohesive unit. All Soldiers must know the relationship of C-UAS to other combined arms tasks, such as coordinate air-ground integration, perform airspace management, and disseminate early warning.

A-4. Airspace management and control is the other crucial component of C-UAS. Maneuver units must train as a combined arms force and conduct integration and synchronization with airspace management, air defense, aviation (friendly UAS), and fires elements to successfully counter effects of enemy air attacks. Integrating TTP allows maneuvering units to request immediate friendly UAS or close air support to locate, observe, nullify or destroy LSS UAS threat.

COMBINED ARMS C-UAS TASK IDENTIFICATION

A-5. Combined arms commanders and staffs at all echelons must plan to educate and train their units to conduct C-UAS tasks while performing operational missions. This training must become part of the unit's mission essential task list and evaluation program.

A-6. C-UAS training skills must be taught correctly in order for the Soldiers and leader's to recognize and identify adversary UAS tactics and their effects. C-UAS training tasks should become routine functions and standardized across the force.

C-UAS SUSTAINMENT TRAINING

A-7. Commanders should address the necessity of C-UAS training beyond Initial Entry Training as these tasks must be planned and conducted at the unit, especially when mobilization and alert orders are received.

Sustainment training keeps Soldiers focused on C-UAS skills so the unit can quickly regain its proficiency. Figure A-1 provides an example of a unit's C-UAS training model.

A-8. Sustainment training offsets many of the contributing factors linked to the degradation of individual and collective skills. Commanders must consider personnel turnovers such as the loss of experienced team members when considering frequencies of required training. Retraining becomes necessary as units prepare for deployments or long periods elapse between training events.

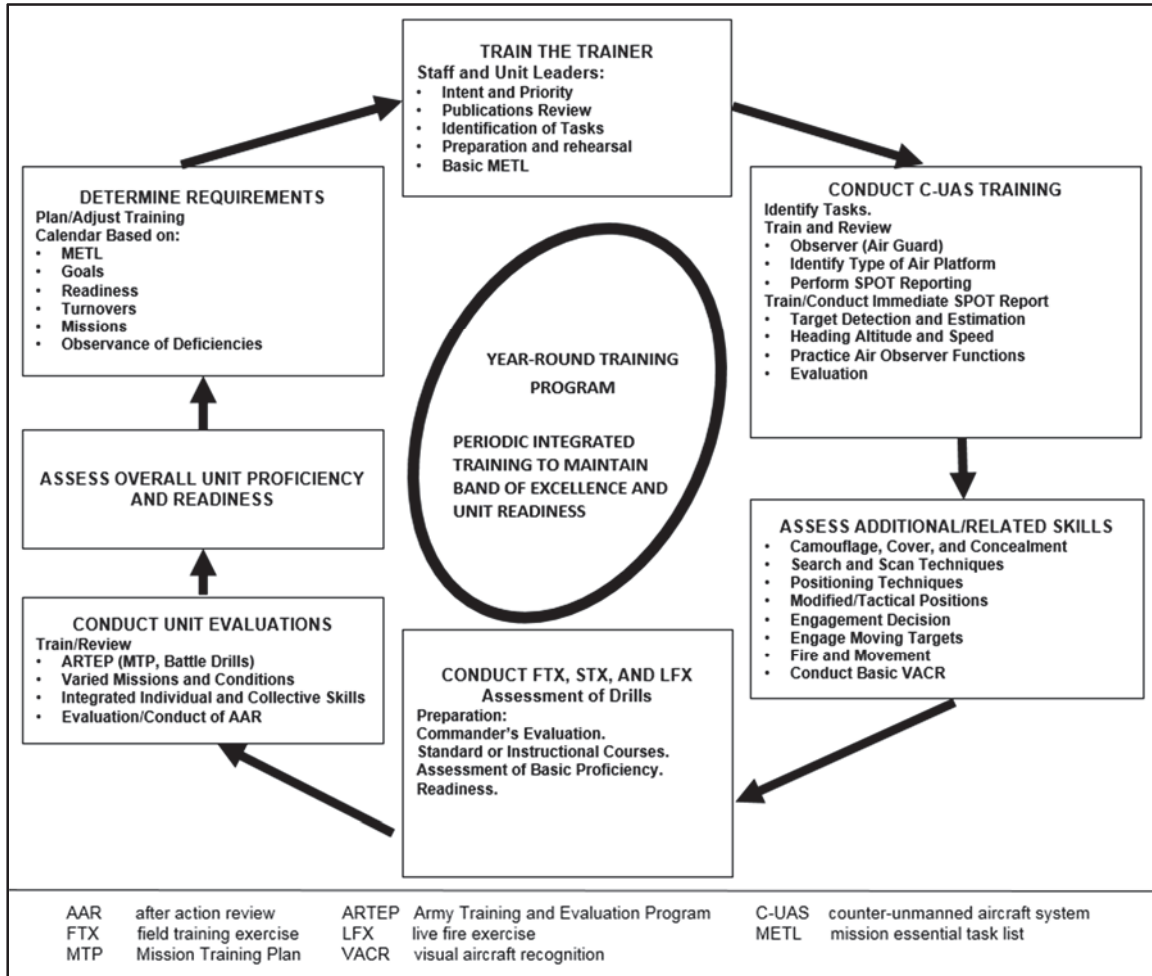


Figure A-1. Unit C-UAS training model example

STANDARDIZED C-UAS TRAINING FOR COMBINED ARMS FORCES

A-9. C-UAS training should be standardized and supported by Department of the Army (DA) Pamphlet 350-38, Standards in Training Commission (STRAC). Combined arms C-UAS training should be applied to all echelons and incorporated into unit's individual and collective combined arms training events to include squad and platoon-level live-fire exercises. Training events should be coordinated for realistic UAS threat representations. This includes the tasks: Defend against hostile LSS UAS and spot reporting procedures. Teach these tasks at the brigade through company level and incorporate them into the unit's standard operating procedures.

A-10. Identifying C-UAS specific tasks to be trained and evaluated at the unit helps the commander outline measurable conditions and standards to be used in evaluating an organization and individuals' abilities to perform these tasks. See Table A-1 (C-UAS individual training task) beginning on page A-3, and Table A-2, beginning on page A-6 (C-UAS collective training tasks).

Table A-1. C-UAS Individual Training Task

Task Number	Task Name	Task Steps	References
44-1-1000	Defend Against Hostile Low, Slow, Small (LSS) Unmanned Aircraft Systems (UASs).	<p>1. Leaders direct combined arms air defense measures against hostile aerial platforms not attacking a stationary unit.</p> <ul style="list-style-type: none"> a. Search assigned sectors of airspace for aerial platforms utilizing the 20 degree from ground level search technique. b. Identify and report presence of aerial platforms in the area and send Priority Intelligence Requirement (PIR) to higher headquarters (Conduct Spot Report, see Chapter 4, Observer [Air guard] Techniques). c. Give air attack alarm. d. Occupy defensive positions with cover and concealment if available. <p>Note. When making the decision of whether or not to fire at non-attacking hostile aerial platforms with small arms, take into consideration the assigned mission and tactical situation. Unit must positively and visually identify aerial platforms prior to engaging with small arms unless the aircraft is committing a hostile act. Once the decision to engage has been made, continue to scan for additional enemy UASs as the engagement takes place.</p> <ul style="list-style-type: none"> e. Leader makes engagement decision. f. Unit engages the aerial platforms with all available small arms (rifles and machine guns). <p>Note. Expect the firing signature from small arms to disclose the unit's own position.</p> <ul style="list-style-type: none"> g. Engagement causes no fratricide. h. Reload weapons following engagement. i. Send PIRs to higher headquarters. <p>Note. Aim points for propeller-driven aircraft are the same as for helicopters. Select aim points in football field lengths: one football field equals approximately 91 meters.</p> <p>Once the lead distance is estimated, the riflemen and machine gunners aim and fire their weapons at the aim point until the aircraft has flown past that point. Maintain the aim point, not the lead distance. The weapon should not move once the firing cycle starts.</p>	<p>ATP 3-04.64 Multi-Service Tactics, Techniques, and Procedures for the Tactical employment of Unmanned Aircraft Systems</p> <p>ATP 3-01.8 Combined Arms for Air Defense</p> <p>Local Standard Operating Procedure (SOP)</p>

Table A-1. C-UAS Individual Training Task (continued)

<i>Task Number</i>	<i>Task Name</i>	<i>Task Steps</i>	<i>References</i>
44-1-1000	Defend Against Hostile Low, Slow, Small (LSS) Unmanned Aircraft Systems (UASs).	<p>Establish preselected aim points when the unit is in a static position.</p> <p>Accuracy in relation to target hits is not necessary. Accuracy in relation to the aim point is necessary. Coordinated high-volume of fire that the aircraft has to fly through, will achieve the desired results.</p> <p>2. Engage aerial platforms with small arms.</p> <p>a. Soldiers utilize all the basic firing positions for air defense except the prone position.</p> <p>b. Soldiers using semi-automatic weapons will assume a supported firing position with cover if available, firing a cyclic rate of 20-25 rounds.</p> <p>c. Soldiers using machine guns will assume a supported firing position utilizing cover if available, firing a 50-100 round burst at the target aiming point.</p> <p>d. If necessary gunners use fellow Soldiers, trees, debris and man-made structures as hasty firing supports.</p> <p>3. Leaders direct small arms air defense measures against hostile aerial platforms attacking a moving target.</p> <p>a. Give air attack alarm.</p> <p>b. Disperse vehicles laterally and in-depth or vehicle operators continue to move unit.</p> <p>c. Move vehicles to covered, concealed positions. All personnel not assigned crew served weapons dismount and prepare to engage the aircraft or increase dispersion.</p> <p>d. Engage non-attacking aircraft only as directed.</p> <p>e. Visually identify threat aerial platforms.</p> <p>f. Report all aerial platforms actions to higher headquarters using spot report.</p> <p>g. Senior leader order the unit to engage.</p> <p>h. Engage the aerial platforms with all available small arms.</p> <p>i. Reload weapons following engagement of aircraft.</p> <p>4. Leaders direct combined arms air defense measures against hostile aerial platforms attacking stationary unit.</p> <p>a. Give air attack alarm.</p> <p>b. All available personnel immediately engage attacking aerial platforms per SOP.</p> <p>c. Reload weapons following the engagement.</p>	<p>ATP 3-04.64 Multi-Service Tactics, Techniques, and Procedures for the Tactical employment of Unmanned Aircraft Systems</p> <p>ATP 3-01.8 Combined Arms for Air Defense</p> <p>Local SOP</p>

Table A-1. C-UAS Individual Training Task (continued)

Task Number	Task Name	Task Steps	References
44-1-1000	Defend Against Hostile Low, Slow, Small (LSS) Unmanned Aircraft Systems (UASs).	<p>d. Personnel assigned to defense operations continue to scan their assigned sectors.</p> <p>e. Report any aircraft action to higher headquarters.</p> <p>f. Report casualties to higher headquarters.</p> <p>g. Evaluate situation and move unit position as directed by tactical situation or SOP.</p> <p>5. Unit leaders directs small air defense measures during convoy movement.</p> <p>a. Alert vehicle commanders of impending attack.</p> <p>b. Disperse vehicles alternately to shoulders of the road (off road, if possible). Turn to covered, concealed positions if terrain permits.</p> <p>c. Maintain vehicle intervals or increase interval or dispersion. Use evasive driving techniques.</p> <p>d. Dismount and take up firing positions.</p> <p>e. Prepare personnel to fire on orders of the senior individual present or automatically return fire (per engagement procedures) if an aircraft is attacking.</p> <p>f. Identify the aerial platforms.</p> <p>g. Engage the aerial platforms with all available small arms (rifles and machine guns).</p> <p>h. Reload weapons following the attack.</p> <p>i. Report the attack and submit priority information requirements to higher headquarters.</p> <p>j. Report any casualties to higher headquarters.</p>	<p>ATP 3-04.64 Multi-Service Tactics, Techniques, and Procedures for the Tactical employment of Unmanned Aircraft Systems</p> <p>ATP 3-01.8 Combined Arms for Air Defense</p> <p>Local SOP</p>
ATP Army Techniques Publication PIR priority intelligence requirement SOP Standard Operating Procedure			

Table A-2. C-UAS Collective Training Tasks

Task Number	Task Name	Task Steps	References
44-6-0001	Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats.	<p>1. The military decision-making process is initiated.</p> <p>a. Identify members of the staff who will participate in C-UAS low, slow, and small mission analysis.</p> <p>b. Assemble the staff and other military, civilian, host-nation, and unified action partners for the C-UAS planning process.</p> <p>c. Commander issues initial guidance.</p> <p>2. The staff conducts review of possible C-UAS operations.</p> <p>a. Collects necessary planning tools:</p> <p>1) Appropriate publications and documents related to the C-UAS mission and area of operations.</p> <p>2) Higher headquarters and other organizations' C-UAS intelligence and assessment products.</p> <p>3) Standard C-UAS operating procedures of higher headquarters.</p> <p>b. Update running estimates with key civilian considerations that affect each C-UAS warfighting functional area.</p> <p>c. Conduct an initial assessment.</p> <p>3. The staff conducts mission analysis upon receipt of commander's C-UAS initial guidance:</p> <p>a. Analyze the higher headquarters' operations order (OPORD) or operations plan (OPLAN) to understand available assets that can support C-UAS operations, such as sensor and shooter assets.</p> <p>b. Perform initial C-UAS intelligence preparation of the battlefield:</p> <p>(1) The staff defines the operational environment by:</p> <p>(a) Identifying the limits of the commander's area of operation.</p> <ul style="list-style-type: none"> • Large enough to accomplish the C-UAS mission and protect the force. • Area of influence where a commander is directly capable of influencing C-UAS operations. <p>(b) Identify the limits of the commander's area of C-UAS interest for further analysis.</p> <ul style="list-style-type: none"> • Define an area large enough to include any C-UAS threat that could influence accomplishing the command's mission. • Consider all factors of the C-UAS mission, enemy, terrain and weather, troops and support available, time available, and civil considerations. <p>(c) Identify significant characteristics of Named Area of Interests (NAIs) associated with enemy UAS operations and the operational areas of interest.</p>	<p>Proponent: 44 - Air Defense Collective</p> <p>Task #</p> <p>44-6-0001 (Brigade/Battalion)</p> <p>Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats (BDE/BN)</p> <p>Dated: 24 Nov 2015</p>

Table A-2. C-UAS Collective Training Tasks (continued)

Task Number	Task Name	Task Steps	References
44-6-0001	Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats.	<ul style="list-style-type: none"> • Collect information on terrain using the five military aspects of terrain: obstacles, avenues of approach, key terrain, observation and fields of fire, and cover and concealment (OAKOC). • Collect information on weather and its effects on all aspects of the C-UAS operations. • Collect information on civil considerations by using areas, structures, capabilities, organizations, people, and events (ASCOPE) <p>(d) Initiate process to acquire information necessary to complete C-UAS IPB.</p> <p>(2) The staff determines how the environment affects C-UAS operations by:</p> <p>(a) Identify types of UAS threats and their capabilities based on environmental effects.</p> <p>(b) Determine how the UAS threat can affect friendly operations.</p> <p>(c) Determine how terrain can affect C-UAS threat operations.</p> <ul style="list-style-type: none"> • Analyze terrain using OAKOC. • Develop the modified combined obstacle overlay and terrain effects matrix. <p>(d) Determine how weather can affect C-UAS operations.</p> <p>(e) Determine how civil considerations can affect C-UAS threat operations.</p> <p>(3) The staff evaluates the enemy UAS threats to the area of operations.</p> <p>(a) Evaluate the type UAS threat.</p> <ul style="list-style-type: none"> • Reconnaissance threat. • Surveillance threat. • Fire Support and Target Acquisition threat. • Attack threat. <p>(b) Evaluate the type of enemy UAS ground control stations.</p> <ul style="list-style-type: none"> • Mobile-hand carried, mobile tablet, self-guided via Global Positioning System (GPS) or electronic control interface. • Laptop computer controlled. • Intra-Continental-control via cyber network. <p>(c) Evaluate the type of enemy command and control nodes.</p> <ul style="list-style-type: none"> • Electronic switch controlled. • Android or Linux based software interface. <p>(d) Identify UAS threat characteristics, order of battle and composition, disposition, strength, tactics, training, logistics, combat effectiveness, electronic technical data, information operations data, and other support data.</p>	<p>Proponent: 44 - Air Defense Collective Task # 44-6-0001 (Brigade/Battalion) Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats (BDE/BN) Dated: 24 Nov 2015</p>

Table A-2. C-UAS Collective Training Tasks (continued)

Task Number	Task Name	Task Steps	References
44-6-0001	Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats.	<p>(e) Refine and create UAS threat group models.</p> <ul style="list-style-type: none"> • Convert C-UAS threat doctrine or patterns of operation into graphics. • Describe the UAS threat tactics and options. • Identify potential UAS high value targets. • Develop threat UAS characteristics, threat template, threat capabilities statement, and high value target list. <p>(4) The staff determines threat courses of action. (5) Develop the desired effect(s) of countering enemy UAS efforts. (6) Create a C-UAS event template and matrix. (7) The staff, led by the Intelligence section, develops the following IPB products as input to support the military decision making process and the staff's running estimates.</p> <p>c. Determine specified, implied, and essential tasks. d. Review available assets and identify resource shortfalls. e. Determine constraints placed on the command. f. Identify critical facts and develop assumptions. g. Assess risk. h. Develop the initial commander's critical information requirements. i. Develop the initial essential elements of friendly information. j. Develop the initial information collection plan. k. Update the staff planning timeline. l. Develop initial themes and messages. m. Develop a proposed problem statement. n. Develop a proposed mission statement. o. Develop COA evaluation criteria for the commander's approval. p. Brief the mission analysis to the commander. q. Commander develops and issues the initial commander's intent and planning guidance. r. Issue warning order #2 to subordinate headquarters.</p> <p>4. The staff develops COAs based on the mission statement, commander's intent, planning guidance, and the products develop during C-UAS mission analysis:</p> <ul style="list-style-type: none"> a. Develop valid prospective COAs that are feasible, acceptable, suitable, distinguishable, and complete. b. Establish options for prospective COAs by: <ol style="list-style-type: none"> (1) Determine the Army operational framework the commander will use to articulate the visualization of operations in terms of time, space, purpose, and resources. (2) Verify that the selected operational framework nests within higher headquarters concept of operations by: 	<p>Proponent: 44 - Air Defense Collective Task # 44-6-0001 (Brigade/Battalion) Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats (BDE/BN) Dated: 24 Nov 2015</p>

Table A-2. C-UAS Collective Training Tasks (continued)

<i>Task Number</i>	<i>Task Name</i>	<i>Task Steps</i>	<i>References</i>
44-6-0001	Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats.	<p>c. Assess initial forces for each prospective COA.</p> <p>d. Develop a broad concept of operations for each COA, expressed in both narrative and graphic forms.</p> <p>e. Designate a task organization by assigning headquarters to groupings of forces.</p> <p>f. Develop COA statements and sketches.</p> <p>g. Conduct a COA briefing for the commander that includes the most likely and most dangerous threat UAS COAs.</p> <p>h. Refine analysis if commander rejects or modifies COAs</p> <p>5. The staff conducts COA analysis to identify difficulties or coordination problems with each COA.</p> <p>a. Identify known critical UAS events and decision points.</p> <p>b. Select a C-UAS wargaming method.</p> <p>c. Select a technique to record and display UAS wargaming results.</p> <p>d. Wargame the COAs and assess the results.</p> <p>(1) Evaluate:</p> <p>(a) Friendly capabilities.</p> <p>(b) Threat UAS capabilities and critical civil considerations that impact operations.</p> <p>(c) Global media responses to proposed actions.</p> <p>(d) Movement considerations.</p> <p>(e) Threat UAS Group 1, 2 and 3 speed categories.</p> <p>(f) Threat UAS Group 1, 2 and 3 threat range of operations.</p> <p>(g) Threat UAS Group 1, 2 and 3 airspace elevation operations.</p> <p>(h) Capabilities of threat UAS systems.</p> <p>(i) Desired effects of countering efforts.</p> <ul style="list-style-type: none"> • Defeat. Render the target ineffective. • Deny. Hinder the adversary's use of their UAS. • Destroy. Render the UAS unusable. • Exploit. Deception measures in order to use UAS to track back to the ground control station or to give the enemy deceptive information. • Blind. Render surveillance capabilities of the UAS ineffective. • Spoof. Trick the UAS into not achieving its goals. • Overwhelm. Render the surveillance capabilities of the UAS ineffective. • Steal. Control the UAS to access what information it has onboard. 	<p>Proponent: 44 - Air Defense Collective Task #</p> <p>44-6-0001 (Brigade/Battalion) Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats (BDE/BN)</p> <p>Dated: 24 Nov 2015</p>

Table A-2. C-UAS Collective Training Tasks (continued)

Task Number	Task Name	Task Steps	References
44-6-0001	Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats.	<ul style="list-style-type: none"> • Deceive. Trick the UAS into believing in something that is not true. (2) Identify assets required to support the C-UAS operations and to synchronize sustainment. (3) Perform any additional analysis quickly and incorporate the results into the C-UAS wargaming record. e. Review results of C-UAS wargaming. f. Conduct a C-UAS wargame brief (Optional) on: (1) Higher headquarters mission, commander's intent, and operations plan. (2) Updated IPB. (3) Assumptions. (4) Friendly and threat COAs. 6. The staff compares COAs: 7. The commander selects a COA and the staff prepare and issue warning order #3. 8. The staff produces and distributes the OPORD or OPLAN. 9. The commander conducts confirmation briefings with subordinate commanders immediately after the OPORD or OPLAN briefing.	Proponent: 44 - Air Defense Collective Task # 44-6-0001 (Brigade/Battalion) Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats (BDE/BN) Dated: 24 Nov 2015
COA	course of action	C-UAS	counter-unmanned aircraft system
OPORD	operation order	UAS	unmanned aircraft system
		OPLAN	operation plan

ESTABLISHING C-UAS TRAINING PROGRAMS AND RELATED TASKS

A-11. Commanders training programs establish sustainment-training goals allowing the unit to maintain competent, qualified personnel and offset perishable skills. Commanders consider personnel movements as losses of experience to their proficient teams or qualified crews and must plan training frequencies around deployment and losses of key personnel. Incorporating C-UAS tasks into the unit's training program should include performance measures and evaluation criteria consistent with Army and proponent standards as prescribed under the U.S. Army Central Army Registry.

A-12. Commanders and staff plan necessary training to facilitate training readiness. C-UAS training should be synchronized with higher headquarters collective training events to address combined arms tasks associated with anticipating contact with threat UAS. Anticipated contact could be received through early warning of aerial platforms (rotary-wing, fixed-wing, unmanned aircraft systems) in the area from higher echelon unit, organic sensors, or ground personnel UAS spot reports. The following table (Table A-3, on page A-11) contains sample task recommendations for commanders to consider when training personnel on C-UAS operations.

Table A-3. Sample C-UAS Training Frequency Chart

Task	Individual	Team	Collective	Frequency			Event	Assessment
				Weekly	Monthly	Quarterly		
44-6-0001 Plan to Counter Low, Slow, Small (LSS) Unmanned Aerial System Threats (BDE/BN)		X	X		X	X	Team Training	T/P/U
44-1-1000 Defend Against Hostile Low, Slow, Small LSS) Unmanned Aircraft Systems	X	X	X		X	X	Team Training	T/P/U
44-4-1050 Perform Airspace Management Functions		X	X		X	X	Unit Team Training	T/P/U
44-6-1003 Coordinate Air-Ground Integration		X	X			X	Unit Team Training	T/P/U
44-4-3501 Disseminate Early Warning								T/P/U
ART 6.5.3 Establish Local Security								T/P/U
ART 6.1.3 Deny Enemy Use of Airspace								T/P/U
ART 6.1.1.1 Search for Aerial Platforms								T/P/U
ART 6.1.1.2 Detect Aerial Platforms								T/P/U
ART 6.1.1.3 Locate Aerial Platforms								T/P/U
63-6-2011 Evaluate the Threat								T/P/U
ART 6.1.1.4 Characterize Aerial Platforms								T/P/U
ART 6.1.4 React to Enemy Aerial Attack								T/P/U
ART 6.7.2 Disperse Tactical Forces								T/P/U
ART 6.1.2.4 Employ Combined Arms for Air Defense								T/P/U
ART 6.1.2 Destroy Aerial Platforms								T/P/U
Perform Observer (Air Guard) Techniques								T/P/U
STP 21-1-SMCT 071-COM-0030 Engage Target with Assigned Weapon								T/P/U

Table A-3. Sample C-UAS Training Frequency Chart (continued)

Task	Individual	Team	Collective	Frequency			Event	Assessment
				Weekly	Monthly	Quarterly		
STP 21-1-SMCT 071-COM-0513 Select Hasty Fighting Positions								T / P / U
STP 21-1-SMCT 113-COM-2070 Operate SINCGARS Single-Channel								T / P / U
STP 21-1-SMCT 113-COM-1022 Perform Voice Communications								T / P / U
STP 21-1-SMCT 171-COM-4079 Send a Situation Report								T / P / U
171-COM-4080 Send a Spot Report								T / P / U
STP 21-1-SMCT 071-COM-0804 Perform Surveillance without the Aid of Electronic Device								T / P / U
STP 21-1-SMCT 071-COM-0815 Practice Noise, Light, and Litter Discipline								T / P / U
STP 21-1-SMCT 071-COM-4408 Construct Individual Fighting Position								T / P / U
STP 21-1-SMCT 052-COM-1361 Camouflage Yourself and Your Individual Equipment								T / P / U
STP 21-24-SMCT 071-326-5705 Establish an Observation Post								T / P / U
STP 21-24-SMCT 071-331-0002 Conduct Defense by a Squad								T / P / U
STP 21-24-SMCT 191-379-4407 Plan Convoy Security Operations								T / P / U
STP 21-24-SMCT 191-379-4408 Plan Security for a Command Post								T / P / U
CPX	Command Post Exercise		P	needs practice		STP	Soldier's Training Publication	
SMCT	Soldier's Manual Of Common Task		T	trained		U	untrained	

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

ADA	Air Defense Artillery
BAE	Brigade Aviation Element
CBRN	chemical, biological, radiological, and nuclear
COA	course of action
C-UAS	Counter-Unmanned Aircraft System
FAAD	Forward Area Air Defense
FSO	fire support officer
IAMD	Integrate air and missile defense
IPB	Intelligence preparation of the battlefield
LSS	low, slow, small
MDMP	military decision making process
NAI	named areas of interest
TAI	target areas of interest
TAIS	Tactical Airspace Integration System
TTP	tactics, techniques, and procedures
UAS	unmanned aircraft systems

SECTION II – TERMS

Active Air Defense

(DOD) Direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile air and missile threats against friendly forces and assets. (JP 3-01)

Active Defense

(DOD) The employment of limited offensive action and counterattacks to deny a contested area or position to the enemy. See also passive defense. (JP 3-60)

Air Defense Artillery

(DOD) Weapons and equipment for actively combating air targets from the ground. (JP 3-01)

Airspace Management

(DOD) The coordination, integration, and regulation of the use of airspace of defined dimensions. (JP 3-52)

Commander's Intent

(DOD) A clear and concise expression of the purpose of the operation and the desired military end state that supports mission command, provides focus to the staff, and helps subordinate and supporting commanders act to achieve the commander's desired results without further orders, even when the operation does not unfold as planned. See also assessment; end state.(JP 3-0)

Combined Arms Team

(DOD) The full integration and application of two or more arms or elements of one Service into an operation. (JP 3-18)

Course of Action

(DOD) Any sequence of activities that an individual or unit may follow.(JP 5-0)

Defended Asset List

(DOD) A listing of those assets from the critical asset list prioritized by the joint force commander to be defended with the resources available. Also called DAL. (JP 3-01)

Identification

(DOD) In arms control, the process of determining which nation is responsible for the detected violations of any arms control measure. (JP 3-01)

Integrated Air and Missile Defense

(DOD) The integration of capabilities and overlapping operations to defend the homeland and United States national interests, protect the joint force, and enable freedom of action by negating an adversary's ability to create adverse effects from their air and missile capabilities. Also called IAMD. (JP 3-01)

Intelligence

(DOD) The product resulting from the collection, processing, integration, evaluation, analysis, and interpretation of available information concerning foreign nations, hostile or potentially hostile forces or elements, or areas of actual or potential operations. (JP 2-0)

Named Area of Interest

(DOD) The geospatial area or systems node or link against which information that will satisfy a specific information requirement can be collected, usually to capture indications of adversary courses of action. Also called NAI. See also area of interest. (JP 2-01.3)

Operation

(DOD) A military action or the carrying out of a strategic, operational, tactical, service, training, or administrative military mission. (JP 3-0)

Operational Environment

(DOD) A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. Also called OE.(JP 3-0)

Passive Air Defense

(DOD) All measures, other than active air defense, taken to minimize the effectiveness of hostile air and missile threats against friendly forces and assets. See also air defense. (JP 3-01)

Reconnaissance

(DOD) A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. (JP 2-0)

Recovery and Reconstitution

(DOD) Those actions taken by a military force during or after operational employment to restore its combat capability to full operational readiness. See also recovery. (JP 3-35)

Tactical Air Control Party

(DOD) A subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft. Also called TACP. (JP 3-09.3)

Troop Leading Procedures

(Army) A dynamic process used by small-unit leaders to analyze a mission, develop a plan, and prepare for an operation. (ADP 5-0)

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These sources must be available to intended users of this publication.

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13 April 2017

By Order of the Secretary of the Army:

MARK A. MILLEY
General, United States Army
Chief of Staff

Official:

A handwritten signature in black ink, appearing to read "Gerald B. O'Keefe". The signature is written in a cursive style with a large initial "G" and a distinct "O'Keefe" ending.

GERALD B. O'KEEFE
Administrative Assistant to the
Secretary of the Army
1710005

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