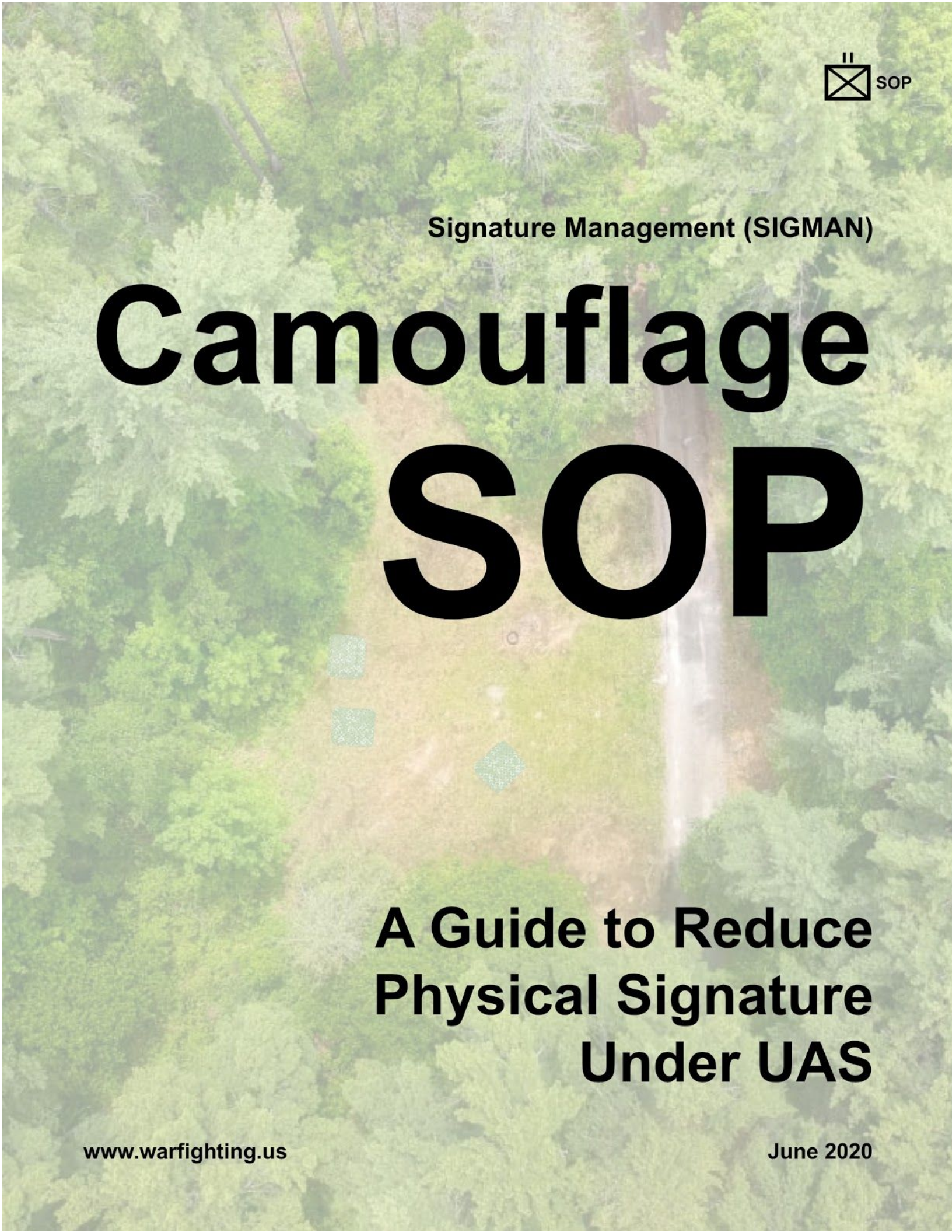

SOP

Signature Management (SIGMAN)

Camouflage SOP

A Guide to Reduce Physical Signature Under UAS

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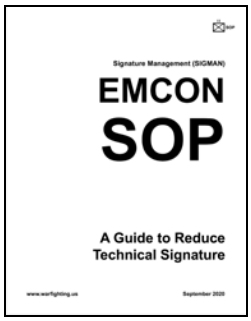
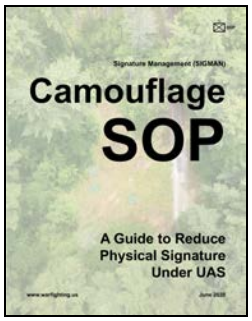
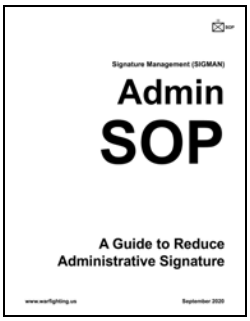
June 2020







SIGMAN Camouflage SOP:
A Guide to Reduce Physical Signature Under UAS

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Edition: 30 June 2020

Purpose

"To be detected is to be targeted is to be killed."

- *Marine Corps Operating Concept*, 2016
- *Marine Corps Concept for Signature Management*, 2017

The threat has changed. Our adversaries, large and small, now integrate ISR sensors, especially UAS, with long-range precision fires. For U.S. forces, this is the end of guaranteed air superiority.

Operations have changed. *Littoral Operations in a Contested Environment (LOCE)*, 2017, and *Expeditionary Advanced Base Operations (EABO)*, 2018, require Fleet Marine Forces to support Navy sea control missions.

Marines will seize key maritime terrain—Expeditionary Advanced Bases (EABs)—in order to establish fires, ISR, aircraft, logs, C2, or air and missile defense sites. These distributed EABs, operating under the arc of enemy long-range precision fires, will expand the Fleet's sea control, challenge the enemy's ability to target us, and free ships for other missions.

Outside the EABO concept, while conducting traditional amphibious operations or sustained operations ashore—even against unsophisticated adversaries—Marines will still face the threat of advanced sensors and long-range precision fires. UAS are everywhere.

For any mission, any adversary, and any environment, units must ruthlessly reduce their signature. Battle positions and operating bases must be small, dispersed, well-camouflaged, and temporary.

Purpose of this SOP

To REDUCE the physical signature (visual, IR thermal, and radar) **of the infantry battalion IOT AVOID being observed and targeted by the adversary.**

We can reduce, but never completely mask our signature. We will avoid observation to protect our combat power for later attacks. The signature of the infantry battalion, with 700 Marines and few vehicles, is less than other units of the GCE, less than the equipment-heavy units of the ACE and LCE, and far less than any partnered Army or Navy units.

Camouflage and concealment DISRUPTS the enemy's intelligence, surveillance, and reconnaissance efforts. Our units DISPERSE into multiple small elements, PICK concealed sites, OPERATE at night, CAMOUFLAGE people, positions, and equipment, MINIMIZE movement, POST air guards, and PLAN to operate under UAS.

Camouflage discipline includes **light** discipline, **heat** discipline, **noise** discipline, **trash** discipline, and **movement** discipline.

Scope of this SOP

Infantry battalion. Overhead UAS and ground-based sensor threats. Precision missile (LACM), rocket, artillery, and mortar fires threats. Urban, woodland / jungle, and desert environments, but NOT arctic / snow.

The *Marine Corps Concept for Signature Management*, 2017, defines three types of signatures: physical, technical, and administrative. This SOP addresses ONLY the physical signature.

UAS identification is out of scope. Counter-UAS attack is out of scope. EMCON is out of scope. Decoys and tactical deception are out of scope. Redundant positions are out of scope. Field-expedient painting of equipment is out of scope.

Organization of this SOP

Chapter 1 is the actual **SOP**, camouflage procedures and battle drills. Chapter 2 is **How To**, a collection of camouflage instructions. Chapter 3 is **Train**, a guide to training units on the SOP. Chapter 4 is **Understand**, with sources that explain adversary capabilities. Chapter 5 is **Reference**, with additional background materials.

This *Camouflage SOP* is a collective effort. If you can improve this document, send us your ideas or join the online Google Doc.

bbmcbreen@warfighting.us
28 June 2020

“The majority of UAS...are used to detect and identify targets for other weapons… Solutions such as camouflage and smoke can… defeat both attack UAS and fires enabled by UAS.”

- *U.S. Army C-UAS Strategy*, 2016

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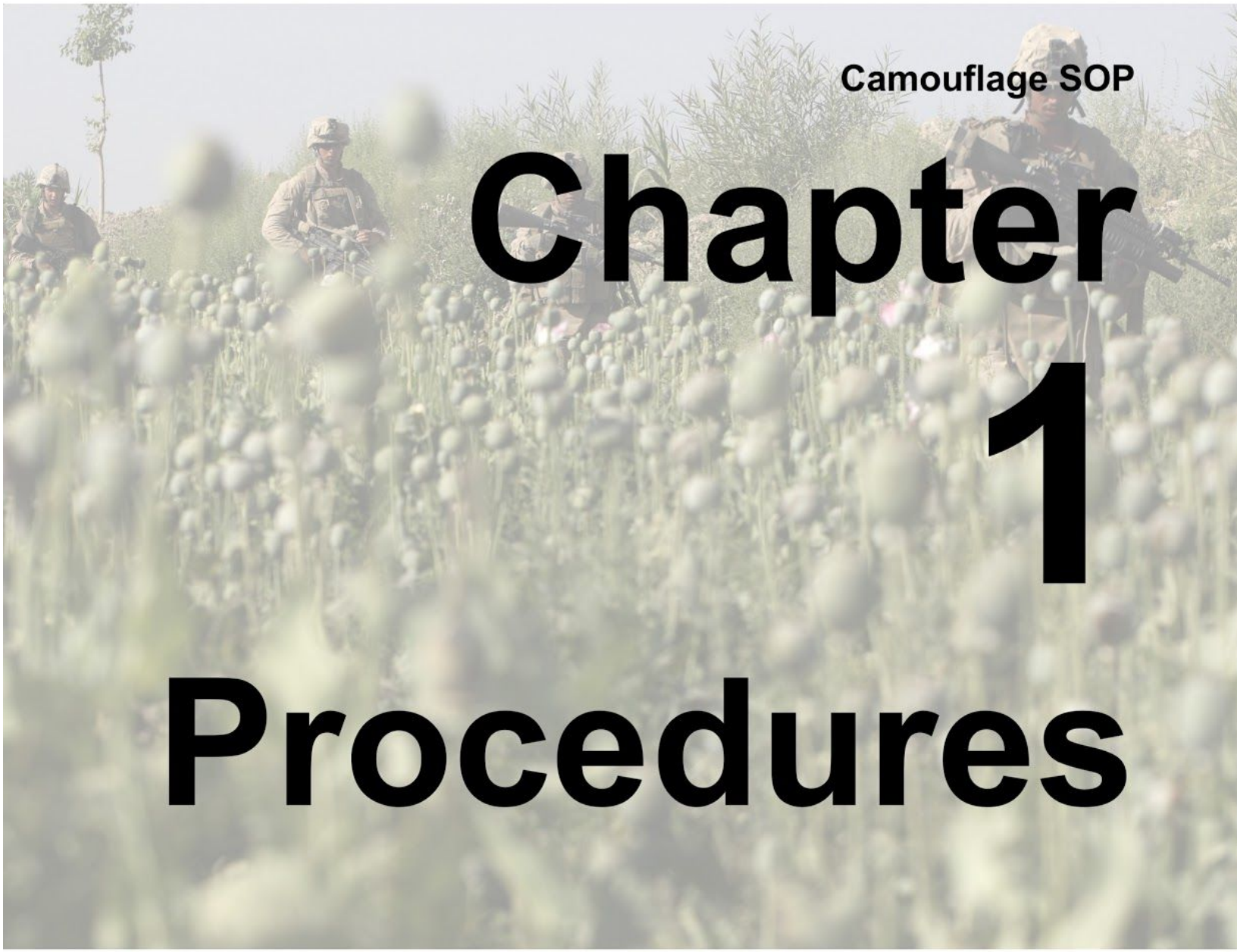

Chapter 1

Procedures

In this Chapter

- Camouflage standard operating procedures
- Camouflage battle drills

SIGMAN Camouflage SOP:
Chapter 1: Procedures

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SOP

CAMOUFLAGE Standards

Purpose. To REDUCE the physical signature (visual, IR thermal, and radar) of the unit IOT AVOID being observed and targeted by the adversary.

Standards

1. **ALL Marines**:
   CAMOUFLAGE your helmet. See CAMOUFLAGE a Helmet.
   CARRY a camouflage ghillie blanket. See CAMOUFLAGE a Pack.
   MASK the shine on your optics and equipment.
   SILENCE your gear.

2. **ALL NCOs**:
   TRAIN your Marines on this SOP.
   TRAIN your Marines on fieldcraft.
   TRAIN your Marines on camouflage discipline. Camouflage discipline includes **light** discipline, **heat** discipline, **noise** discipline, **trash** discipline, and **movement** discipline.

3. **ALL SNCOs**:
   TRAIN your Marines on this SOP. INSPECT and CORRECT your Marines on this SOP.
   MEMORIZE the *Camouflage Inspection Checklist* standards.
   ENFORCE your Marines' camouflage discipline. Camouflage discipline includes **light** discipline, **heat** discipline, **noise** discipline, **trash** discipline, and **movement** discipline.

4. **ALL drivers**:
   CARRY a camouflage net on your vehicle roof. See CAMOUFLAGE a Vehicle.
   CAMOUFLAGE your vehicle if you are stopped for more than one hour.
   DISPERSE while moving. DISPERSE when stopped. DISPERSE irregularly when parked.
   Standard dispersion is three vehicle lengths.

5. **ALL convoy commanders**:
   ORGANIZE serials of no more than twelve vehicles.
   PLAN concealed routes in woodlines, wadis, and riverbeds.

PLAN concealed stops in the shadows of trees or buildings.
LOWER speed to reduce dust signature. Or put larger vehicles in front so their dust masks the rest of the convoy.
BRIEF and REHEARSE the REDEYE Drill. See REDEYE Drill.
BRIEF and REHEARSE the HAWKEYE Drill. See HAWKEYE Drill.
ASSIGN an air guard. See Air Guard SOP. ENFORCE movement discipline.

6. **ALL air guards**:
SCAN and LISTEN for adversary UAS.
BPT initiate the REDEYE Drill. See REDEYE Drill.
TRAIN on adversary UAS capabilities.

7. **ALL logistics Marines**:
ESTABLISH resupply procedures that REDUCE the signature of the unit.
Air resupply and ground resupply actions are easily seen from the air.
CAMOUFLAGE RRPs, vehicles, and pallets. Pallet shape and shadow are distinctive.
DISTRIBUTE supplies rapidly to avoid build-up. REMOVE all trash and dunnage.

8. **ALL unit leaders**, squad, section, platoon, and company:
TRAIN your unit on this SOP. TRAIN attachments on this SOP.
TRAIN your unit on camouflage discipline. ENFORCE standards.
PAINT rifles. The battalion commander has authorized painted rifles.
BRIEF and REHEARSE camouflage SOP drills:

SOP Drill	Purpose	Triggered by	Cancelled by:
REDEYE	"UAS. Freeze!	Any Marine: **"REDEYE. UAS at one o'clock!"**	Unit leader: "STAND DOWN REDEYE"
HAWKEYE	"Camouflage the unit!"	Unit Leader: **"HAWKEYE 1520!"**	Unit Leader: "STAND DOWN HAWKEYE"
LONGBOW	"Attack the UAS!"	Unit Leader: **"LONGBOW team up!"**	Unit Leader: "STAND DOWN LONGBOW"

Notes

Attached unit leaders are responsible for the training and camouflage discipline of their people.

As a tenant in a base camp, unit leaders discuss SIGMAN issues with the camp commandant.

SOP

CAMOUFLAGE Fundamentals

Purpose. To REDUCE the signature (visual, IR thermal, radar) of the unit IOT AVOID being observed and targeted by the adversary.

ALL unit **SOPs** and camouflage **TTPs** CONFORM to the following Camouflage Fundamentals.

1. DISPERSE into multiple small **elements**. This is the most important step.
   BE **indistinguishable**—unable to be identified as different—IOT avoid being targeted.
   ASSUME you are being watched.
   DISPERSE individuals, vehicles, and positions irregularly. DISPLACE **often**.

2. PICK a concealed **site**.
   CONFORM to terrain. FIND low dead ground and micro-terrain, behind hills, tucked against the shadows of buildings, or under trees. In the city, move *inside* a building.

3. OPERATE at **night**.
   Camouflage discipline includes light discipline. TRAIN in night operations, with NVGs, lasers, and camouflage ghillie blankets. OPERATE in rain, fog, wind, and dust when UAS cannot fly. OPERATE at dawn or dusk when shadows are long, sun glare is high, and thermal crossover masks your heat signature. KNOW the daily light levels.

4. CAMOUFLAGE **people**, **positions**, and **equipment**.
   BLEND with your background. Camouflage discipline includes **light** discipline, **heat** discipline, **noise** discipline, **trash** discipline, and **movement** discipline. Minimize lights. Mask engines, heaters, and generators. Silence all equipment. Leave NO trash behind, especially dunnage. Control convoy movements.

5. MINIMIZE **movement**.

6. POST an **air guard**.

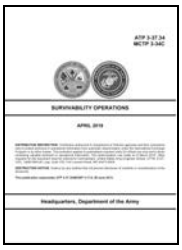
7. PLAN to operate under **UAS**. Think overhead. Hills block visual, thermal, and radar observation, but the biggest threat is overhead UAS. PLAN concealed routes and positions.

PLAN operations at critical times. MINIMIZE logistics requirements. PLAN resupply events.

USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature from the enemy's viewpoint.

COUNTER adversary HUMINT, OSINT, and ELINT efforts. This information cues ISR platforms. Reduce the signature of your unit so that the adversary does NOT prioritize his ISR assets against you.

References


ATP 3-37.34 / MCTP 3-34C *Survivability Operations*, 16 Apr 2018. 190 pages.

bbmcbreen@warfighting.us, 28 Jun 2020.

SOP

HAWKEYE Drill

Purpose. To REDUCE the physical signature (visual, IR thermal, and radar) of the unit IOT avoid being observed and targeted by the adversary.

Conditions. The unit is stationary, operating at a base camp, TAA, or BP. Or the unit is moving, conducting footmobile operations, NOT in contact with the enemy. For convoy operations, see the HAWKEYE Convoy Drill.

Standard. In 20 minutes, the unit's physical signature fades to zero. The unit cannot be seen or heard by a ground or air adversary 1000m away.

Equipment. Each Marine and each vehicle carries the camouflage equipment they need.

Trigger. The unit leader calls the codeword and the time: **"HAWKEYE 1520!"**

Only the **unit leader** can stop the current mission. When he or she makes the deliberate decision to trigger the drill—because of enemy action, an intelligence report, or as a preparation for combat—all movement stops for 40 minutes and HAWKEYE *becomes* the mission.

The mission of the HAWKEYE camouflage and concealment drill is to **disrupt** the enemy's intelligence, surveillance, and reconnaissance units. Any scheduled activities by subordinate units are delayed.

Process

1. **STOP** and **DISPERSE**.

All units, all Marines, and all vehicles CEASE all activities.
Marines move to their defensive Stand-To positions, or, if moving, select a hasty position.
Slowly. Do NOT run. Do NOT increase the physical signature of the unit.

2. **CAMOUFLAGE** your position for 20 minutes.
Execute camouflage SOPs for individuals, positions, vehicles, TAAs, and CPs.

3. **STAND-TO** for 20 minutes.
Do NOT move. Do NOT radio. For 20 minutes the unit is dead still, dead quiet.
Only the unit leader can end the HAWKEYE drill: "STAND DOWN HAWKEYE."

Responsibilities

Unit leaders are responsible for their unit's signature. **NCOs** camouflage their units and equipment. **SNCOs** inspect and correct. An **Air Guard** is posted.

Notes

HAWKEYE is NOT a UAS immediate action (IA) drill. See REDEYE Drill.
HAWKEYE is NOT a counter-UAS (C-UAS) attack. See LONGBOW C-UAS Drill.
HAWKEYE can be integrated into a unit's existing Stand-To Drill.
EMCON is a separate drill which may be conducted simultaneously.
In order to meet the 20 minute standard, units must already have good camouflage discipline.
HAWKEYE should be a scheduled event to camouflage the unit when occupying a TAA or BP.
In a TAA, no units depart during the drill. Units arriving stop and camouflage in place.

Camouflage should be a distinct activity, supervised, timed, and inspected to a standard. Camouflage is not an optional action, attempted indifferently, as time permits.

Related Processes

REDEYE Drill directs the unit to freeze and then operate under UAS observation.
LONGBOW C-UAS Drill directs the unit to attack a UAS.
HAWKEYE Convoy Drill directs a convoy to stop and camouflage.
Stand-To Drill directs the unit to occupy prepared fighting positions.

7 June 2020

SOP

HAWKEYE Convoy Drill

Purpose. To REDUCE the signature (visual, IR thermal, radar) of the convoy IOT avoid being observed and targeted by the adversary.

Conditions. The unit is moving by convoy, NOT in contact with the enemy.

Standard. The unit cannot be seen or heard by a ground or air adversary 1000m away.

Equipment. Each Marine and each vehicle has the camouflage equipment they need.

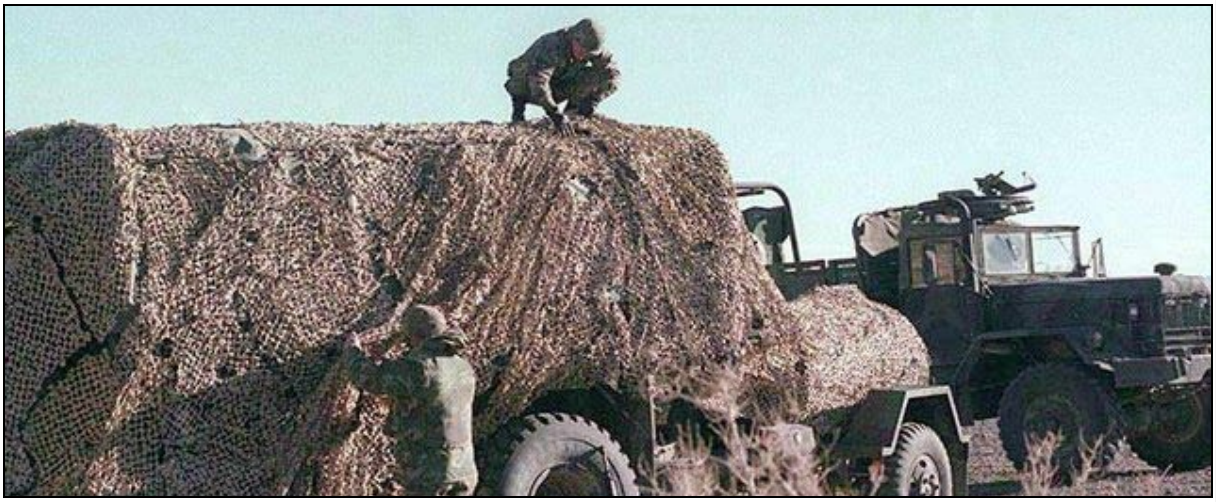
Trigger. The unit leader calls the codeword and the time: **"HAWKEYE the convoy 1520!"**

Only the **unit leader** can stop the convoy. Moving is the best method to avoid being targeted, but stopping is best to avoid detection. When the unit leader makes the deliberate decision to trigger the drill, all movement stops for 40 minutes and HAWKEYE *becomes* the mission.

Process

1. **STOP** and **DISPERSE**.
   All vehicles pick a good site and kill their engines.
   Slowly. Do NOT increase the physical signature of the unit. Do NOT raise dust.
   Disperse at least three vehicle lengths from the next vehicle.

2. **CAMOUFLAGE** your vehicle for 20 minutes.



   See CAMOUFLAGE a Vehicle.

3. **STAND-TO** for 20 minutes.
   Do NOT move. Do NOT radio. For 20 minutes the unit is dead still, dead quiet.
   Only the unit leader can end the HAWKEYE drill: "STAND DOWN HAWKEYE."

Notes

Camouflage is only the last step to reduce the signature of a convoy. DISPERSE into multiple small elements. Serials should be twelve vehicles or less. SELECT concealed routes. Use woodlines, wadis, and riverbeds. OPERATE at night. POST an air guard.

Camouflage discipline includes light discipline, heat discipline, noise discipline, trash discipline, and movement discipline.

10 June 2020

SOP

REDEYE Drill

Purpose. To ALERT the unit when an adversary UAS is sighted.

Conditions. The unit is stationary or moving.

Standard. The unit FREEZES. In 5 minutes, the unit leader decides what to do.

Equipment. NONE.

Trigger. An adversary UAS is sighted. Any Marine calls the codeword and the location:

"REDEYE. UAS at one o'clock!" or **"REDEYE. UAS to the west, over the river."**

Process

1. **FREEZE**: all units, all Marines, and all vehicles.

GO prone if you are on foot in the open. Minimize your shadow. COVER yourself with a camouflage ghillie blanket, poncho, or tarp.

STAY behind and under the trees if you are in the woods. PUT something between you and the UAS. STAY inside if you are in the city. STAY away from the windows.

AVOID looking up immediately. An obvious feature of aerial photos is upturned faces. Faces shine, eye protection reflects light, and optics reflect light. Cover all optics. Cover the lens of the Trijicon RCO with a kill-flash (honeycomb).

Do NOT run. Do NOT increase the signature of the unit.

2. **RESPOND** to the unit leader's orders:

   a. "FREEZE." Do NOT move. They may not have seen us.

   or

b. **"CONTINUE** the mission." They have seen us and we will operate under adversary observation. The unit leader refuses to let his unit be suppressed or disrupted by an adversary UAS.

or

c. **"ATTACK** the UAS. LONGBOW team up!" C-UAS actions are a separate process. See LONGBOW C-UAS Drill.

or

d. **CAMOUFLAGE** the unit: "HAWKEYE 1520!" **See** HAWKEYE Drill.
In a bivouac, TAA, or BP, execute the camouflage drill for individuals, positions, vehicles, and CPs.

3. **REPORT** UAS to S-2 and HHQ.

See example UAS Report format in Table 3-1 of ATP 3-01.8 *Techniques for Combined Arms for Air Defense*, 29 July 2016.

Responsibilities

Although an **air guard** is always posted, **any** Marine can call REDEYE. **NCOs** enforce camouflage discipline. **SNCOs** inspect and correct.

The **unit leader** decides on the response to adversary UAS. REDEYE requires a critical combat decision when the unit is operating under the arc of the adversary's long-range precision fires.

"Does he see me?" is NOT the question.The unit leader needs to assess "What will he do with this information?" Has he been sighted by an enemy squad or an enemy battalion? A fire network? Does the adversary use UAS to recon for a ground attack, call for fire, or solely BDA?

Notes

REDEYE is a UAS immediate action (IA) drill, executed automatically. REDEYE for small UAS is no different than for large UAS. Identification of the specific UAS is not required. Often, an adversary UAS will be heard before it is seen.

REDEYE is executed at night. A UAS operating at night must be assumed to have IR thermal sights.

REDEYE is NOT the same as AIR ATTACK. Air defense warning conditions (RED, YELLOW, WHITE) and weapons control status (TIGHT, HOLD, FREE) do NOT apply to UAS. The air attack drill—three horns terminated by an "All Clear" signal—assumes that the enemy aircraft will be overhead for only minutes. With multiple, persistent UAS overhead, we cannot make that assumption.

24 June 2020

SOP

LONGBOW C-UAS Drill

Purpose. To attack an adversary UAS.

Conditions. The unit is stationary or moving.

Standard. In 20 minutes, the UAS is driven off, jammed, disrupted, or destroyed.

Equipment. C-UAS weapons.

Trigger. An adversary UAS is sighted. See REDEYE Drill.

Process

1. **ALERT**. "LONGBOW team up!" The unit leader calls the designated C-UAS team.
   Only the **unit leader** can make the deliberate decision to attack the UAS. Generally, you shoot only if you think you've been seen, because engaging a UAS unmasks your position.

2. **ATTACK.** Shoot at the UAS. The LONGBOW C-UAS team attacks the UAS.

3. **REPORT.** The result of the UAS encounter is reported to the S-2 and HHQ.

   See example UAS Report format in Table 3-1 of ATP 3-01.8 *Techniques for Combined Arms for Air Defense*, 29 July 2016.

Notes

The LONGBOW counter-UAS (C-UAS) SOP is an active C-UAS measure. It is NOT a UAS immediate action (IA) drill. See REDEYE Drill.

C-UAS weapons are under development. Even when fielded, many units will NOT have C-UAS capability. In 2020, Marine infantry units, with no active C-UAS weapons, must rely on direct-fire weapons and passive responses to adversary UAS.

The LONGBOW C-UAS team is an additional duty assigned to an existing unit.
Marines NOT involved in C-UAS actions should maintain camouflage discipline.

Low, small, and slow UAS are flown by the adversary from nearby clearings and hilltops. Aggressive patrolling of key terrain can push adversary UAS operators away from your unit.

19 June 2020

SOP

Air Guard SOP

Purpose. To sound the ALERT when the unit is being observed by adversary UAS.

1. Every separate unit POSTS an air guard—at all times, day and night—for all operations. If two or more air guards are posted, then sectors are assigned.

2. The air guard WATCHES and LISTENS for adversary UAS. The air guard KNOWS the alert process. See REDEYE Drill. The air guard may or may NOT be trained in UAS recognition.

3. The air guard does NOT attack UAS.
C-UAS actions are a separate action.
See LONGBOW C-UAS Drill.

4. The air guard duty rotates, like any other duty. It is NOT a sleeping post. Air guard may be an additional duty for the existing security watch.

   LP/OP should be assigned the air guard mission to listen for UAS.

References

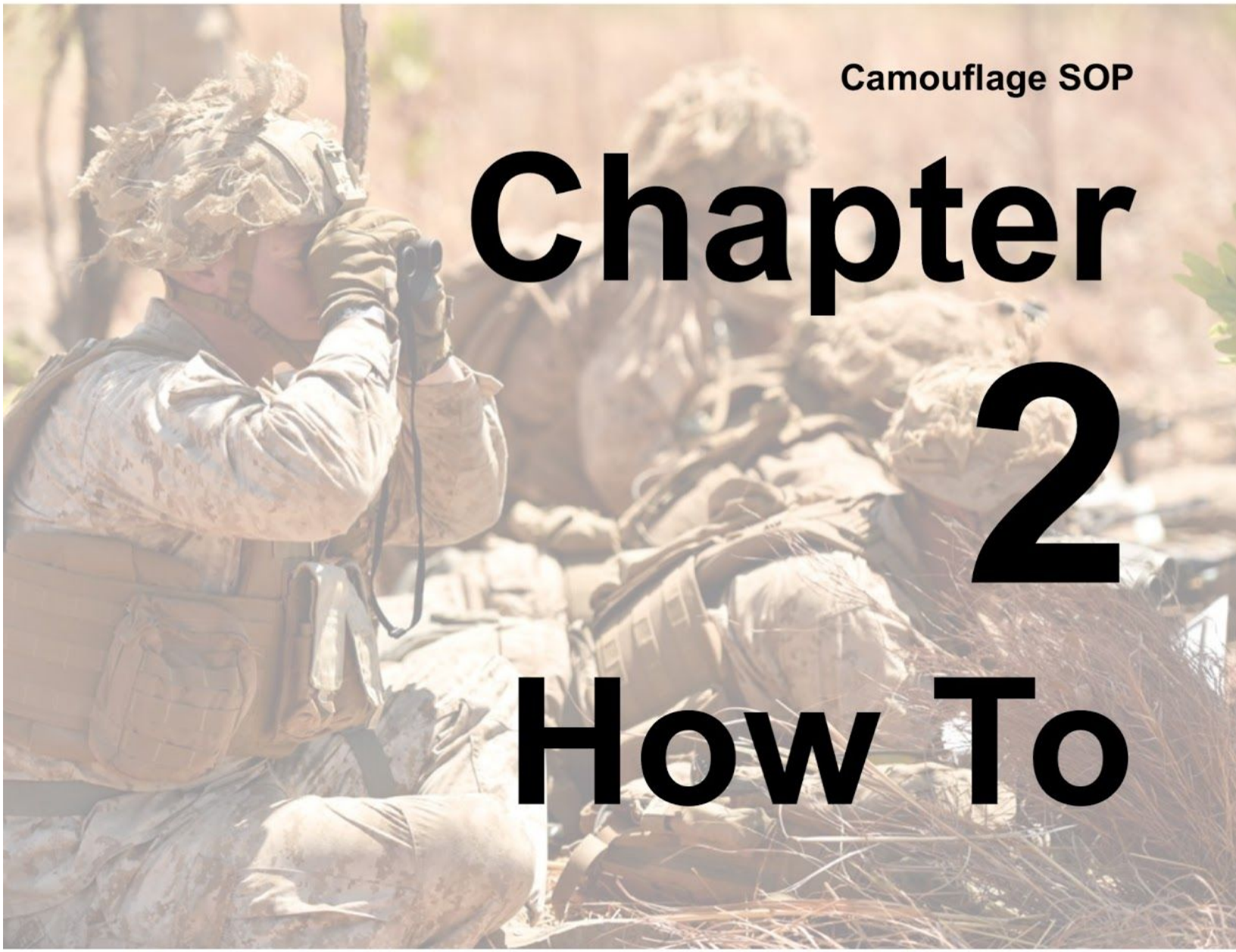

ATP 3-01.8

Techniques for Combined Arms for Air Defense

JULY 2016

Headquarters, Department of the Army

ATP 3-01.8 *Techniques for Combined Arms for Air Defense*, 29 July 2016. 68 pages.



Chapter 2 How To

In this Chapter

- How to camouflage equipment
- How to camouflage a vehicle
- How to camouflage positions

SIGMAN Camouflage SOP:
Chapter 2: How To

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How To

CAMOUFLAGE a Helmet

Purpose. To REDUCE the physical signature (visual) of the helmet IOT AVOID being observed and targeted by the adversary.



Time

With an already camouflaged helmet, a Marine adds foliage in 10 minutes.

Equipment

Net, helmet band, zip ties, boot bands, burlap strips. Camouflage net. Foliage.

Process

1. DRAPE a net over the helmet. Secure with a helmet band, zip ties, or boot bands.

Augment with knotted burlap strips.



Or,

Drape a camouflage net over the helmet. Secure with a helmet band, zip ties, or boot bands.


Or,

Prepare the helmet with boot bands. Use foliage in the field.



2. ADD natural camouflage to blend with your environment.

Notes

The *shape* of the helmet—its most recognizable characteristic —must be changed.

Avoid interfering with the NVG mount.

The kevlar helmet has no radar signature.

When the enemy is near, camouflage your face and exposed skin.

25 June 2020

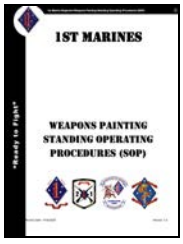
How To

CAMOUFLAGE a Rifle

Purpose. To REDUCE the physical signature (visual) of the rifle IOT AVOID being observed and targeted by the adversary.

Process

1. PAINT your rifle. This requires command authorization.



Weapons Painting SOP. CamPen, CA: 1st Marines, 1 Feb 2020. 48 pages.

An outstanding reference. Authorization letters, Marine Corps Technical Instructions, and step-by-step painting procedures for all infantry weapons.

Or,

2. WRAP **boot bands** around the stock and the hand guards.
ADD **foliage** in the field to blend with your environment.

The linear *shape* and black *color* of the rifle—its most recognizable characteristics—must be masked.

Avoid interfering with the operation of the rifle—optics, chamber, charging handle, magazine well, ejection port.

Instead of foliage, burlap strips can be wrapped around the stock, secured with boot bands. Cloth tape can break up the shape of the stock.

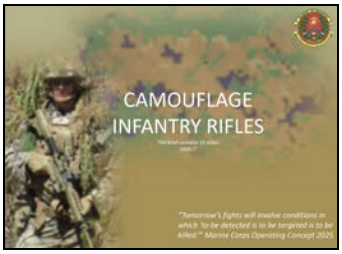
The radar signature of the metal rifle cannot be masked.

Notes on Painted Rifles

Painted rifles are well-camouflaged rifles.

The Marine Corps has published a procedure—requiring command authority—and a Technical Instruction, 10 Dec 2015, on how to paint an M4A1.

References



Chad Skaggs. *Camouflage Infantry Rifles*. Camp Pendleton, CA: SOI-W, 17 Aug 2018.

Testing at the School of Infantry determined that painted rifles were much harder for an adversary to detect.

30 June 2020

How To

CAMOUFLAGE a Pack

Purpose. To REDUCE the physical signature (visual) of the pack IOT AVOID being observed and targeted by the adversary.

Time

With a prepared pack, a Marine adds foliage in 10 minutes.
With a camouflaged ghillie blanket, a Marine covers his equipment in 10 minutes.

Equipment

Bungee cords. Foliage. Camouflage ghillie blanket.

Process

1. WRAP two **bungee cords** around the pack.
2. ADD **foliage** in the field to blend with your environment.

or

3. CARRY a **camouflage ghillie blanket**.
4. COVER your **pack** and equipment.




Notes

550 cord, attached to the pack, belt, or other equipment, can also be used to secure foliage. Burlap strips can be used instead of natural foliage.

MASK the shine on your equipment. Metal buckles and snaps can reflect light. Cover all optics. Cover the lens of the Trijicon RCO with a kill-flash (honeycomb).

AVOID staging packs in neat rows on the ground. Patterns are easily seen from the air.

Notes on Camouflage Ghillie Blanket

A camouflage ghillie blanket is the best way to camouflage a pack, a Marine, or a fighting hole. See CAMOUFLAGE a Fighting Position.

21 June 2020

How To

CAMOUFLAGE a Bivouac

Purpose. To REDUCE the physical signature (visual, IR, thermal, and radar) of the bivouac IOT AVOID being observed and targeted by the adversary.

Process

1. DISPERSE into multiple small **elements**. This is the most important step. BE **indistinguishable** IOT avoid being targeted. DISPERSE positions irregularly. Multiple small bivouacs are better than one large one.

   Avoid **rows** of tents, packs, pallets, or equipment. Avoid rows of vehicles. Patterns are easily seen from the air. DISPLACE often.

2. PICK a concealed **site**.

   Select a site unimportant to the adversary, off the main roads, and away from road junctions.

   CONFORM to terrain. FIND low dead ground and micro-terrain, behind hills, tucked against the shadows of buildings, or under trees. In the city, bivouac inside a building.

3. OCCUPY at **night**. Camouflage discipline includes light discipline.

4. CAMOUFLAGE all **positions** and **equipment**. Every position needs overhead concealment. The camouflage pattern on tarps and tents may not match the background. A camouflage ghillie blanket with a thermal barrier will disrupt your IR thermal signature.

   Camouflage pallets and stacks of supplies.

5. MINIMIZE **movement**.

6. POST an **air guard.**

7. PLAN to operate under **UAS**. Think overhead. Hills block visual, thermal, and radar observation, but the biggest threat is overhead UAS. PLAN resupply events.

   USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature from the enemy's viewpoint.

Notes

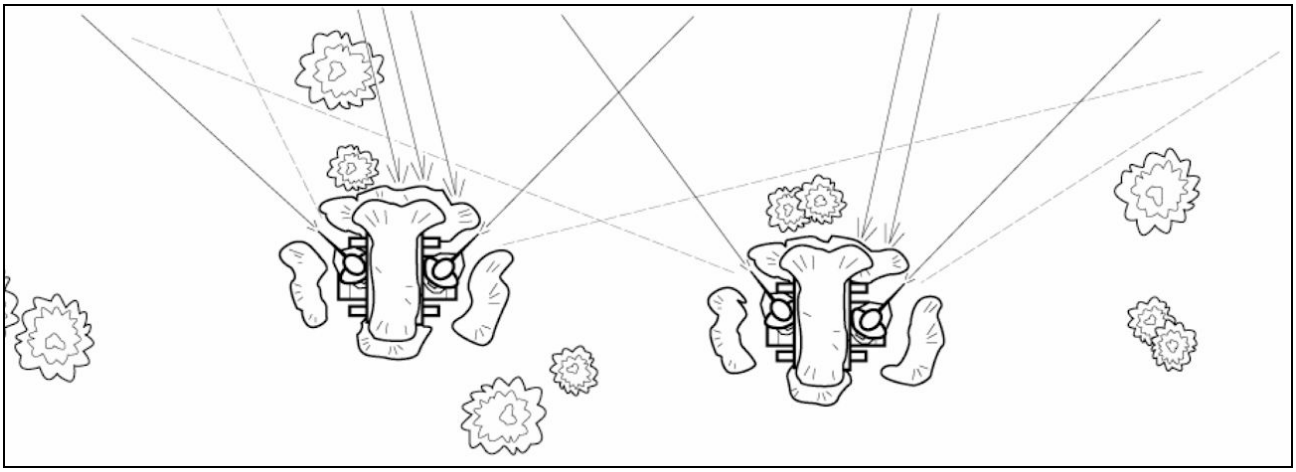
A bivouac with vehicles needs to cordon and mark the bivouac area.

16 June 2020

How To

CAMOUFLAGE a Fighting Position

Purpose. To REDUCE the physical signature (visual, IR thermal) of the fighting position IOT AVOID being observed and targeted by the adversary.



Time. Two Marines should camouflage an already-constructed fighting position in 60 minutes.

Process

1. DISPERSE into multiple small **elements**. This is the most important step.
   BE **indistinguishable** IOT avoid being targeted. ASSUME you are being watched.
   ESTABLISH irregularly-spaced positions, NOT linear positions.

2. PICK a concealed **site**. The mission—the sector of fire—dictates the position. BLEND with your surroundings. AVOID silhouettes. Positions in open desert terrain have few options.

3. OCCUPY at **night**. Camouflage discipline includes light discipline.

4. CAMOUFLAGE your **position**. Every position needs overhead concealment. COVER your position with a camouflage ghillie blanket, a camouflage net, a woven mat, or a MARPAT tarp. ADD foliage to bled with your environment.

1: Ghillie Blanket

2: Camouflage Net

3: Woven Mat

4: MARPAT Tarp

Experiments at SOI-W concluded that the camouflage ghillie blanket is the most effective camouflage against UAS. A camouflage net is second, followed by a locally-constructed woven mat. The MARPAT tarp is the least effective covering due to its square and shiny appearance, distinctive sag, and difficulty in adding foliage. A thermal blanket below the concealment layer disrupts the IR thermal signature.

PICK a position with natural frontal cover to AVOID building a parapet of newly-dug earth.

5. MINIMIZE **movement**.

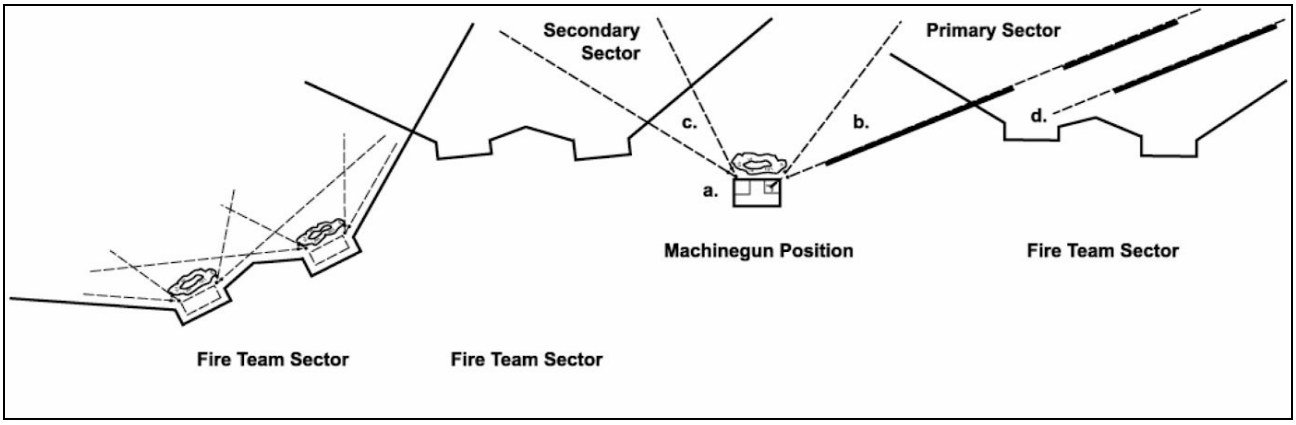
6. POST an **air guard**. LP/OPs should be assigned the air guard mission to listen for UAS.

Crew-served weapons positions

Critical machinegun (MG) and anti-armor (AA) fighting positions must be well-camouflaged.

In the illustration, the MG position (a) is protected by a squad. The MG primary sector (b) is defined by an FPL across the company front. A secondary MG sector (c) protects the left flank. A squad automatic rifle FPL (d) is laid to parallel the MG.

The vital MG position and its protective squad is a single high-priority position and must be well-camouflaged from enemy observation and protected from enemy fires.



LP/OP positions

Every LP/OP needs overhead concealment. In the woods, lash deadfall branches to frame a poncho covering. A thermal blanket disrupts the IR thermal signature.




Notes on Sandbags. Synthetic sandbags “shine like light bulbs” and are easily seen from the air. SOI-W recommends smearing sandbags with mud.

Sandbags shining in the sun. Source: SOI-W camouflage experiments, 2017.

Platoon, Company, and Battalion Battle Positions

Battle position preparations are difficult to mask. Uncontrolled noise, people, activities, equipment, materials, vehicles, and possible engineer support can create an overwhelming signature.

Unit leaders *must* discipline the process to avoid being targeted. OCCUPY at night. STAGGER activities to reduce noise and congestion. CAMOUFLAGE preparations, positions, and supplies.

AVOID excessive clearing. AVOID creating a visible trail to your position. CAMOUFLAGE the CP. CONCEAL spoil. REMOVE trash and dunnage. CONTROL vehicle movement.
CONTROL fires and stoves. Cook in dead ground or under trees, and only during daylight.

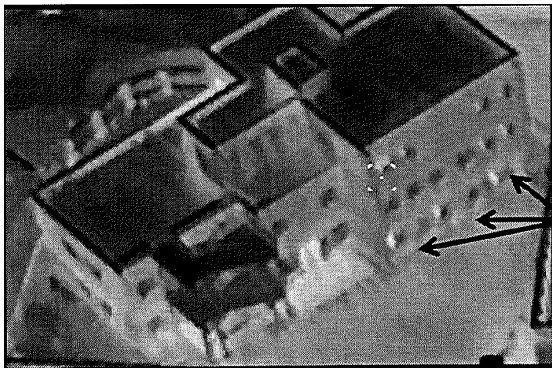
CAMOUFLAGE RES positions. SELECT a concealed CATK position and CATK route.

Battle Positions in MOUT

Existing buildings, indistinguishable from the air, provide both cover and concealment for fighting positions.

Establish firing positions back from the windows, deep in the shadows. Mask dust signature from firing weapons.

AVOID creating obvious IR thermal signatures near windows.



Notes

PLAN to operate under **UAS**. Think overhead. Hills block visual, thermal, and radar observation, but the biggest threat is overhead UAS. PLAN operations at critical times. MINIMIZE logistics

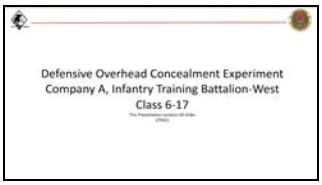
requirements. PLAN resupply events.

USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature from the enemy's viewpoint.

Hasty positions, skirmishers trenches, need overhead concealment early in the process.
Units need TTPs to CAMOUFLAGE a bunker, CAMOUFLAGE a tower, CAMOUFLAGE a building, and CAMOUFLAGE a mortar position.

Low, small, and slow UAS are flown by the adversary from nearby clearings and hilltops. Aggressive patrolling of key terrain can push adversary UAS operators away from your unit.

References



Chadd Skaggs. *Defensive Overhead Concealment Experiment*. CamPen, CA: SOI-W, 11 Apr 2017.

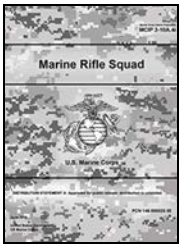
Testing at the School of Infantry evaluated multiple overhead cover options for fighting positions, both in daylight and at night.

Walker Mills. *AAR from 1st Battalion, 4th Marines MCCRE Regarding Small Unmanned Aerial Systems*. CamPen, CA: 2nd Battalion, 1st Marines, 30 Jun 2018.

"An entrenched defense is no longer tenable... against an enemy… with UAS and long-range fires. A defense… needs to prioritize concealment… Digging a… defense is a sure way to get...targeted. The (adversary) was able to identify all the elements… more accurately when they were in the defense than at any other time."

NAVMC 3500.44D *Infantry T&R Manual*, 7 May 2020.

Task 0300-DEF-1001 Construct a Fighting Position
Task 0311-MOUT-2201 Prepare a Fighting Position within a Building
Task INF-ANTI-3002 Construct an Anti-Armor Fighting Position
Task INF-MGUN-3003 Construct a Machinegun Fighting Position



MCIP 3-10A.4i *Marine Rifle Squad*, 10 Jun 2019.

29 Jun 2020

How To

CAMOUFLAGE a Vehicle

Purpose. To REDUCE the physical signature (visual, IR thermal, and radar) of the vehicle IOT AVOID being observed and targeted by the adversary.

Time. After picking a position, two Marines should camouflage a vehicle in 15 minutes.

Equipment. LCSS or ULCANS camouflage netting.

Process

1. DISPERSE into multiple small **elements**. This is the most important step.
   BE **indistinguishable**—unable to be identified as different—IOT avoid being targeted.
   ASSUME you are being watched. DISPERSE vehicles irregularly. DISPLACE **often**.

2. PICK a concealed **site**.

   CONFORM to terrain. FIND low dead ground and micro-terrain, behind hills, tucked against the shadows of buildings, or under trees. In the city, park *inside* a building.

   Blend. Convoys in open desert terrain often have few options.

3. UNROLL the **camouflage net**.

   Stretch out the corners and drape the vehicle.

   The best practice is to carry the rolled net on the roof.

4. LIFT the net with **support poles** to create an irregular shape. The *shape* of the vehicle—its most recognizable characteristic—must be changed.

Get two feet of clearance off the hot engine block.

If radar is a threat, get two feet of clearance off all metal surfaces.

5. PIN the net down with **tent pins**, flush and tight to the ground.

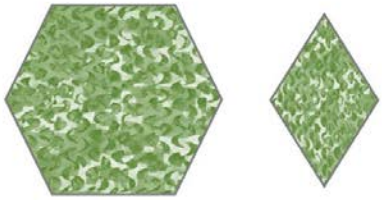
Maximize the slope.
Avoid vertical sides.

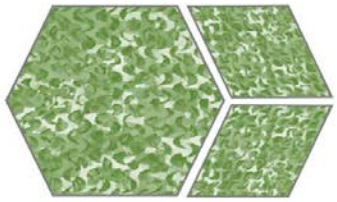
The vehicle shape—its most recognizable characteristic—must be changed.

Notes on Camouflage Nets

Camouflage netting provides concealment where none is available. It is portable, quick to set up, and *multispectral* - masking vehicles from visual, IR thermal, and radar sensors.

The old version, Lightweight Camouflage Screen Systems (LCSS), has been replaced by the newer Ultra Lightweight Camouflage Net Systems (ULCANS). There are three colors. Class 1 is Woodland, Class 2 is Desert, and Class 3 is Snow. Each is reversible, with a different shade on each side. Additionally, nets are typed as either radar scattering or radar transparent (for use with radar vehicles), but the differences are invisible. Each net is labelled with Class and Type.





Camouflage netting comes in two shapes: Hexagon and diamond.
Join one hex and two diamonds (48 x 28 feet) to cover a tactical vehicle.

Notes

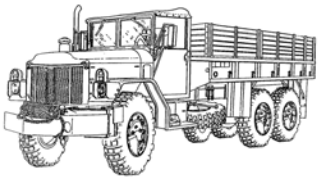
PLAN to operate under **UAS**. Think overhead. Hills block visual, thermal, and radar observation, but the biggest threat is overhead UAS. PLAN concealed routes and positions.
Add natural camouflage to blend with your background. Cover all glass reflections.

Use a thermal blanket to disrupt your heat signature against enemy thermal sights.
Use the right color camouflage netting to blend with your environment. USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature from the enemy's viewpoint.

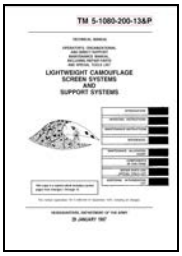
The *contained shadow* is the biggest error made with camouflage netting. Avoid creating a dark triangular gap that can easily be seen from the air.

Camouflage Other Equipment

One hex (28 x 32 feet) covers a generator or a GP Small Tent.
Two hex and two diamonds (56 by 48 feet) covers a truck.
Three hex and three diamonds (56 x 64 feet) covers larger vehicles or a GP Medium tent. See TM 5-1080-250-12&P, pp 1-5.



References



TM 5-1080-200-13&P *Lightweight Camouflage Screen Systems (LCSS)*, Change 10 is 1 Sep 2002. 138 pages.

Chapter 2 is nine pages of operating instructions. The remainder of the manual is maintenance, NSNs, and re-ordering information.

TM 5-1080-250-12&P *Ultralightweight Camouflage Net Systems (ULCANS)*, change 1 is 1 Aug 2008. 99 pages.

Chapter 1 describes ULCANS and diagrams recommended configurations for vehicles and tents. Chapter 2 is nineteen pages of operating instructions.

TM 10-180-256-10 *Ultra Lightweight Camouflage Net Systems (ULCANS) Increment I*, 10 Mar 2020. 188 pages.

Describes the newest ULCANS Increment I.

NAVMC 3500.44D *Infantry T&R Manual*, 7 May 2020.

Task 0300-TVEH-2002, "Camouflage a Tactical Vehicle," is useless.

Chad Skaggs. *Vehicle Camouflage Techniques*. CamPen, CA: SOI-W, 9 June 2018.

24 June 2020

How To

CAMOUFLAGE a CP

Purpose. To REDUCE the physical signature (visual, IR thermal, and radar) of the CP IOT AVOID being observed and targeted by the adversary.

Equipment. LCSS or ULCANS camouflage netting.

Process

1. DISPERSE into multiple small **elements**. This is the most important step.
BE **indistinguishable**—unable to be identified as different—IOT avoid being targeted.
ASSUME you are being watched. DISPLACE **often**.

   AVOID rows of vehicles, packs, pallets, or equipment. Patterns are easily seen from the air.

   DISPERSE antenna farms. Disperse logistics pallets. Disperse generators. Mask noise with a dirt berm or put the generator indoors in the basement.
   Hide security positions, especially barbed wire.

   DISPERSE vehicles with three vehicle lengths between each vehicle.

2. PICK a concealed **site**. Select a site unimportant to the adversary, off the main roads, and away from road junctions.

   CONFORM to terrain. FIND low dead ground and micro-terrain, behind hills, tucked against the shadows of buildings, or under trees. In the city, move *inside* a building.

   Dirt blocks visual, light, thermal, EM, and radar sensors. Woods and towns are good. Dense urban clutter masks EM signals. CPs in open desert terrain have few options. AVOID road junctions.

3. OCCUPY at **night**. Camouflage discipline includes light discipline.

4. CAMOUFLAGE all **tents**, vehicles, logistics pallets, and bivouac areas.
Camouflage netting disrupts **visual** sensors, **radar** sensors, and **IR thermal** sensors.
Cordon and mark bivouac areas.

5. MINIMIZE **movement**. MINIMIZE transmissions for EMCON.
ESTABLISH routes in and out to reduce track signature. CONTROL traffic.

6. POST an **air guard**.

7. PLAN to operate under **UAS**. Think overhead. Hills block visual, thermal, and radar observation, but the biggest threat is overhead UAS. PLAN concealed routes and positions. PLAN resupply events.

   USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature from the enemy's viewpoint.

   COUNTER adversary HUMINT, OSINT, and ELINT efforts. This information cues ISR platforms. Reduce the signature of your CP so that the adversary does NOT prioritize his ISR assets against you.

Notes on Camouflage Nets

See CAMOUFLAGE a Vehicle. One hex (28 x 32 feet) covers a generator or a GP small tent. Three hex and three diamonds (56 x 64 feet) cover a GP Medium tent. See TM 5-1080-250-12&P, pp 1-5.

The *contained shadow* is the biggest error made with camouflage netting. Pin the net flush and tight to the ground. Avoid creating a dark triangular gap that can easily be seen from the air.

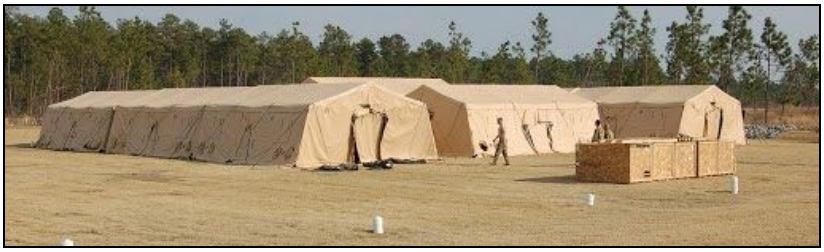
Notes

Use the right color camouflage netting to blend with your environment.

A CP is a critical asset that the adversary will target.
See Command Post SOP. The main CP is four vehicles. The log train and BAS are separate serials. No serials exceed twelve vehicles.

Notes on Base Camps

Base camps, ports, warehouses, and airfields are easily visible from the air. Infantry units are usually tenant organizations. The camp commandant is responsible for base camp SIGMAN and camouflage discipline.



"CPs require excellent camouflage and concealment to survive on the battlefield."

- ATP 3-37.34 *Survivability Operations*, 16 April 2018

28 June 2020

How To

CAMOUFLAGE a TAA

Purpose. To REDUCE the physical signature (visual, IR thermal, and radar) of the TAA IOT AVOID being observed and targeted by the adversary.

Equipment. Each Marine and each vehicle has the camouflage equipment they need.

Process

1. DISPERSE into multiple small **elements**. This is the most important step.
   BE **indistinguishable**—unable to be identified as different—IOT avoid being targeted.
   ASSUME you are being watched.

   DISPERSE vehicles irregularly within the site.

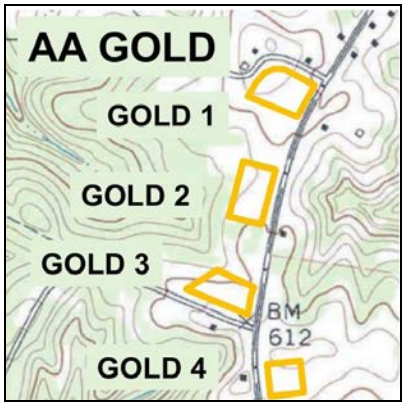
   AVOID rows of vehicles, packs, pallets, or equipment.
   AVOID well-defined square perimeters.
   AVOID clusters of Marines.
   Patterns are easily seen from the air.

   Disperse vehicles with at least three vehicle lengths between each vehicle.

   DISPLACE **often**.

2. PICK a concealed **site**.

   CONFORM to terrain. FIND low dead ground and micro-terrain, behind hills or under trees. Dirt blocks visual, light, thermal, EM, and radar sensors.

   Woods and towns are good. Dense urban clutter masks EM signals. TAAs in open desert terrain have few options.

   For multiple sites, assign separate areas for units, logistics functions, and the CP.

3. OCCUPY at **night**. Camouflage discipline includes light discipline.

4. CAMOUFLAGE all **vehicles**, logistics pallets, CPs, and bivouac areas.
   Camouflage netting defeats **visual** sensors, **radar** sensors, and **IR thermal** sensors.
   See CAMOUFLAGE a Vehicle. Cordon and mark bivouac areas.

5. MINIMIZE **movement**. MINIMIZE transmissions for EMCON. ESTABLISH routes in and out to reduce track signature. CONTROL traffic.

6. POST an **air guard**.

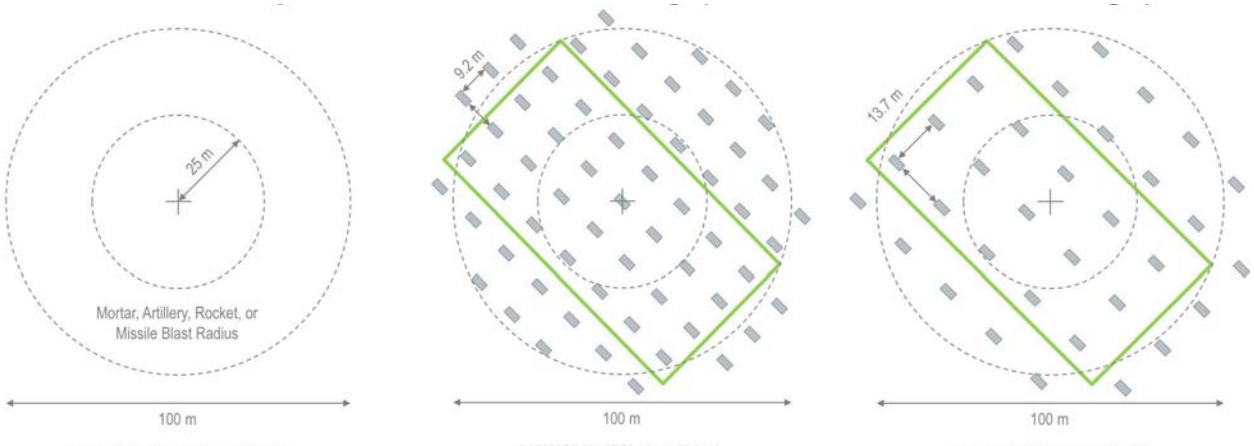
7. PLAN to operate under **UAS**. Think overhead. Hills block visual, thermal, and radar observation, but the biggest threat is overhead UAS. PLAN concealed routes and positions. PLAN operations at critical times. MINIMIZE logistics requirements. PLAN resupply events.

   USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature from the enemy's viewpoint.

   COUNTER adversary HUMINT, OSINT, and ELINT efforts. This information cues ISR platforms. Reduce the signature of your unit so that the adversary does NOT prioritize his ISR assets against you.

Notes on Vehicle Dispersion

Missile, rocket, artillery, and mortar blast effects differ by weapon, size, and munition. HE, DPICM, and fuel-air explosive blasts are different. Generally, however, increasing vehicle dispersion from two to three vehicle lengths, **reduces** the number of vehicles in the kill zone by almost **half**.



Vehicle dispersion. With 30 foot dispersion, 28 HMMWVs fit on a football field. With 45 foot dispersion, 15 HMMWVs fit. **Notes**: Blast effects are not circular. HMMWV is 15 feet long (4.6 m).

28 Jun 2020

Camouflage SOP

Chapter 3

Train

In this Chapter

- Training your unit
- Camouflage training standards
- A *Camouflage Inspection Checklist*

SIGMAN Camouflage SOP:
Chapter 3: Train

www.warfighting.us

Train

CONDUCT a Field Exercise

Purpose. To share best practices on SIGMAN camouflage training.

Training

1. Camouflage standards should be practiced during *all* training and *all* exercises, in *all* environments, regardless of the primary purpose of the training.

   Unit leaders can use time during larger exercises to practice drills and evaluate their own unit's camouflage efforts.

   NCOs train Marines on camouflage discipline. **Camouflage discipline** includes **light** discipline, **heat** discipline, **noise** discipline, **trash** discipline, and **movement** discipline.

   Scout Snipers can train Marines on individual camouflage techniques.

2. Company training should include:

   HAWEYE Drill
   REDEYE Drill
   LONGBOW C-UAS Drill
   Air Guard Training
   USMC UAS capabilities
   Adversary UAS capabilities
   Adversary air, missile, rocket, artillery, and mortar threats

   Training on most company operations should be augmented with camouflage requirements:

   Convoy Operations + Camouflage
   Fighting Positions + Camouflage
   Movement to Contact + Camouflage
   MOUT + Camouflage
   Night Operations + Camouflage
   Patrolling + Camouflage

3. Example training plans are included below.

UNITED STATES MARINE CORPS
2nd Battalion, 5th Marines
Camp Pendleton, CA 92055

28 Aug 2020

From: Commanding Officer
To: Distribution A

Subj: FIELD TRAINING PLAN, 8-10 SEP 2020

Ref: *Battalion SOP*, 30 June 2020

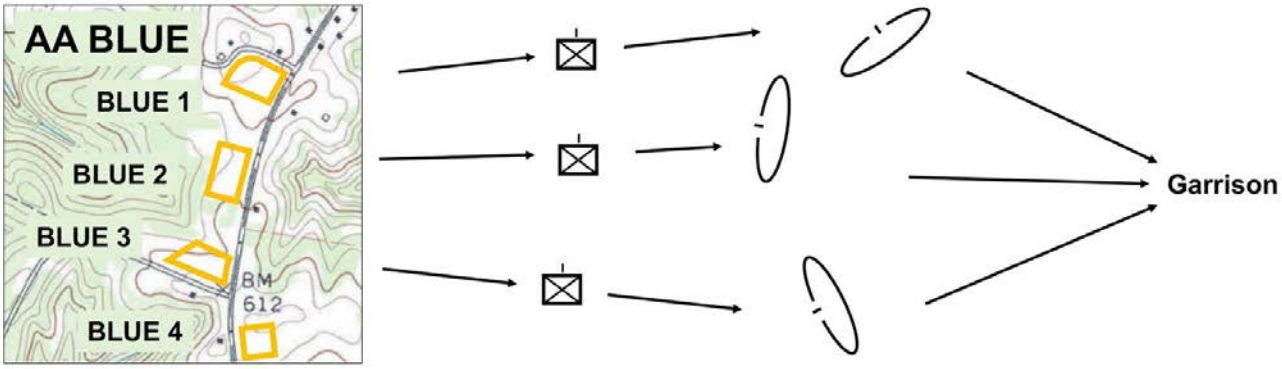
Encl: (1) DODIC List
(2) Exercise FRAGOs

1. Situation. The Bn SOP has been updated with multiple SIGMAN camouflage drills and standards. All Marines and units need to be trained to the established standards.

2. Mission. On 08-10 Sep, 2/5 conducts operations and applies SOP standards IOT evaluate unit camouflage skills.

3. Execution

a. CONOPS. Over three days, each unit executes multiple FRAGOs, all while under adversary ground and air (UAS) observation and probing attacks. From TAA BLUE, units move during the day and night, occupy a BP, conduct security patrols, resupply, and then retrograde.



b. Tasks

(1) Units. OCCUPY TAA BLUE NLT 1000 TUE 8 SEP 2020. EXECUTE operations IAW FRAGOs. TRAIN on SIGMAN Camouflage SOP skills.
(2) OPFOR. COLLECT on Bn units using both ground and air (UAS) assets. Call for fire. CONDUCT probing attacks. PHOTOGRAPH and report on unit sizes and locations. ASSESS unit training levels. BRIEF results at AAR.
(3) EXCON. CONTROL the exercise. ASSESS casualties. CONDUCT AAR in order to improve Bn SIGMAN Camouflage SOP and procedures.

c. Coordinating Instructions

(1) Task Organization
Units (8): E, F, G, 81, HMG, COC, BAS, Log Train.
OPFOR: XO, S-2, SSP, AA Platoon, UAS, and four company 1stSgt.
EXCON is OpsO and a det from the AA Platoon.

(2) Schedule:

Time	Units	OPFOR	EXCON
Tue 1000	OCCUPY TAA BLUE	TAA RED	TAA RED
Tue 1100	FRAGO 01: Movement to Contact	Collect	
Tue 1900	FRAGO 02: Night Infiltration Operation	Collect	
Wed 0800	FRAGO 03: ESTABLISH BP	Collect / Probe	
Wed 1900	FRAGO 04: Night Security Operation	Collect / Probe	
Thu 0800	FRAGO 05: Movement to Garrison	Prepare AAR	Prepare AAR
Thu 1300	Classroom: AAR for all Battalion Leaders	AAR	Run AAR

(3) All FRAGOs will be issued in the field. The OPFOR will NOT see the FRAGOs.

(4) Range control coordination, airspace coordination, and safety vehicle requirements will be executed by EXCON.

(5) NO external support units—transportation or air assault—is planned.

(6) EW and EMCON procedures will NOT be evaluated. OPFOR will NOT collect on technical (EMCON) signatures.

4. Admin and Logistics

a. Encl (1) lists pyrotechnics and blank ammunition requirements. S-4 will issue ammunition in TAA BLUE NLT 1100 Tue 8 Sep 20.

b. S-1 will process daily PERSTATREPs and other required reporting IAW SOP.

c. S-4 Log Train will resupply units each day as a tactical evolution IAW RRP SOP. No hot chow.

5. Communication and Signals. S-6 will establish an EXCON and an OPFOR net. All Battalion units will operate on standard nets IAW Bn SOP.

P.A. BEEKMAN
By dir

Train

ESTABLISH Training Standards

Purpose. To ESTABLISH training standards for camouflage.

Individual Training Standards

1. Task: **Camouflage a Marine.**
   Conditions: In the field.
   Standard: Helmet is camouflaged. Rifle is camouflaged. Marine is equipped with a camouflage ghillie blanket to camouflage person, equipment, or position.

2. Task: **Camouflage a Vehicle.**
   Conditions: Vehicle is stopped for one hour or more.
   Standard: Vehicle is parked in available shadows near buildings or under trees. Vehicle is dispersed irregularly, three vehicle lengths from other vehicles. Vehicle is covered in camouflage netting, raised irregularly off the vehicle outline, and pinned flush to the ground.

Unit Training Standards

1. Task: **Camouflage a unit position.**
   Conditions: In a stationary position—a TAA, BP, or bivouac.
   Standard: The unit cannot be observed from 1000m in open terrain, or 300m in close terrain. Units are dispersed, operating in small elements. Command Post is camouflaged. RRP is camouflaged. Marines are camouflaged. Positions are camouflaged. OPs are camouflaged. Vehicles are camouflaged. Movement is minimized. Lights are not visible. Trash is not visible.

2. Task: **Respond to adversary UAS.**
   Conditions: An adversary UAS is overhead.
   Standard: The unit executes a C-UAS drill directed by the unit leader. A UAS warning is passed. An Air Guard is assigned. A C-UAS element is assigned. The C-UAS element attacks the UAS.

3. Task: **Camouflage a convoy.**
   Conditions: A moving convoy is directed by the unit leader to stop and camouflage.
   Standard: Vehicles are dispersed, operating in serials of twelve vehicles or less. Drivers maintain three vehicle lengths between vehicles. Route was selected based on available concealment. Every vehicle carries camouflage netting. Every vehicle selects a good site to stop. Every vehicle is covered with camouflage netting, pinned flush to the ground.

Marine Corps Infantry Camouflage Standards. NAVMC 3500.44D *Infantry T&R Manual*, 7 May 2020, contains only two camouflage tasks:

0300-TVEH-2002 Camouflage a Tactical Vehicle
0317-PAT-2002 Camouflage Sniper Equipment

Fourteen other tasks mention camouflage as a minor performance step.

INF-FP-5001	Employ Platoon Force Protection Measures
INF-FP-4001	Employ Squad Force Protection Measures
INF-0317-3002	Conduct Scout Sniper Team Operations
INF-ANTI-3002	Construct an Anti-Armor Fighting Position
INF-MGUN-3003	Construct a Machinegun Fighting Position
0300-DEF-1001	Construct a Fighting Position
0300-DEF-1002	Construct a Skirmisher Trench
0300-DEMO-2003	Employ a M18A1 Anti-personnel Mine (Claymore)
0311-MOUT-2201	Prepare a Fighting Position within a Building
0317-PAT-2005	Operate from a Hide
0317-PAT-2006	Conduct Individual Actions in an Observation Post (OP)
0317-PAT-2007	Conduct Individual Actions During Infiltration
0317-OPS-2501	Lead Sniper Operations from a Hide
0317-OPS-2507	Conduct Counter-sniper Operations

Responsibilities. During each phase of an amphibious operation or a raid, both the adversary threat and the responsibility for signature management shifts. Camouflage actions differ in each environment: urban, jungle, wooded, or desert.

Action	Adversary Threat	SIGMAN Responsibility
MOVE by ship toward the coast *undetected*	Satellites, radars, ASCM Ships, submarines, aircraft Mines, patrol craft	Navy
INSERT by surface craft *undetected*	**UAS**, Aircraft Mines, patrol craft Adversary units	Navy
INSERT by helicopter *undetected*	**IADS** (Radar, SAM) Reconnaissance, MANPADS Adversary units	ACE
MOVE on foot toward the objective *undetected*	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
CONVOY by vehicle toward objective *undetected*	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
Actions on the objective	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
MOVE on foot toward the LZ *undetected*	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
INFILTRATE helicopters to LZ *undetected*	**IADS** (Radar, SAM) Observation, MANPADS Adversary units	ACE

EXTRACT unit by helicopter *undetected*	**IADS** (Radar, SAM) Observation, MANPADS Adversary units	ACE
EXTRACT by surface craft *undetected*	**UAS**, Aircraft Mines, patrol craft Adversary units	Navy

Tasks. During extended combat operations ashore, the responsibility for signature management is generally with the unit. But base camps, with multiple units, are a signature challenge. Camouflage actions differ in each environment: urban, jungle, wooded, or desert.

Action	Adversary Threat	SIGMAN Responsibility
MOVE by helicopter within the AO *undetected*	**IADS** (Radar, SAM) Observation, MANPADS Adversary units	ACE
CONVOY by vehicle within the AO *undetected*	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
OCCUPY an AA *undetected*	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
OPERATE from an established base camp	**UAS**, aircraft Reconnaissance, IDF Adversary units	Camp CO
MOVE on foot within the AO	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**
OPERATE from a patrol base *undetected*	**UAS**, aircraft Reconnaissance, IDF Adversary units	**Unit**

30 Jun 2020

Train

COLLECT Own-Force Signature

Purpose. To COLLECT the physical signature of your own unit and see what the adversary sees IOT improve camouflage effectiveness.

Condition. The unit has been stationary for at least two hours. The unit is camouflaged.

Standard. The unit cannot be seen or heard by a ground or air adversary 1000m away.

Equipment. “Camouflage Inspection Checklist,” binoculars, NVGs, PAS-28 thermal scope, or UAS.

Scope. Physical signature is collected by adversary geospatial-intelligence assets (space, aerial, ground, or human) or through direct observation. Technical signature—collected by adversary SIGINT assets and countered by EMCON procedures—is out of scope. Administrative signature (online records) is out of scope.

Process

1. EXAMINE the unit from the adversary’s point of view.
   USE binoculars, NVGs, thermal scopes, and UAS to spot-check your signature.

2. PHOTOGRAPH the unit.
   RECORD discrepancies.

3. REPORT to the unit commander.

Notes

Unit leaders should appoint a SNCO to collect own-force signature. Fieldcraft is SNCO expertise. The observer should understand adversary ISR capabilities—satellites, aviation, UAS, and ground sensors.

The observer should envision the unit signature from the air: lines, lights, vehicles, tracks, fighting positions, spoil, debris, pallets, and supplies.

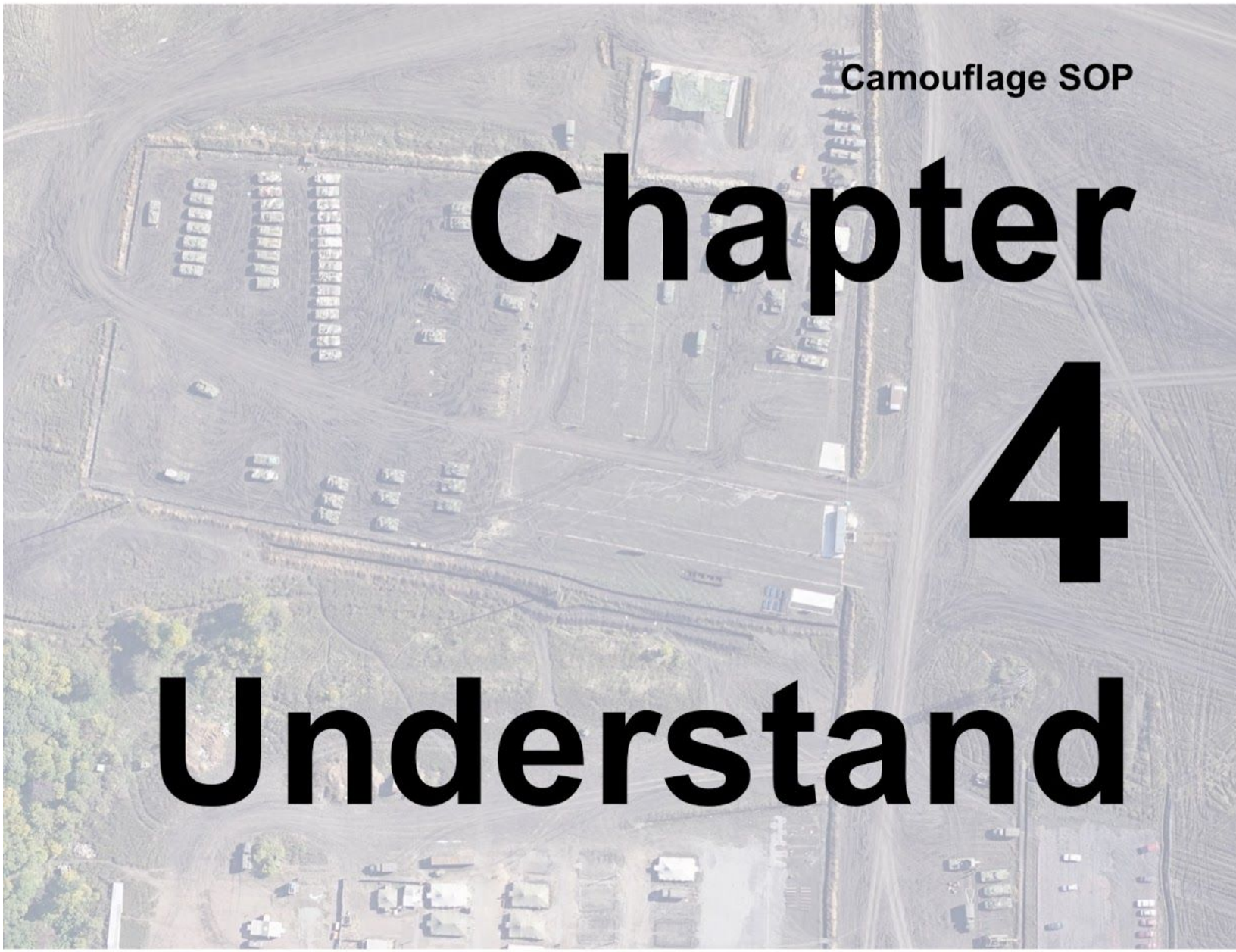
References

Marine Corps Concept for Signature Management, 24 Oct 2017.

“To be detected is to be targeted is to be killed.”

Defines physical, technical, and administrative signatures. Relates signature management (SIGMAN) to CI, OPSEC, MILDEC, fires, and intelligence. Defines the SIGMAN capabilities that the Marine Corps needs.

Camouflage Inspection Checklist		Date:		
Purpose. To inspect a *stationary* unit that has been in an AA or BP for more than two hours.		Unit:		
Scope. NOT a base camp. NOT a movement. NOT a convoy. **Marks**. All "YES" is best.		Initials:		
1.	**Leadership.** Do unit leaders inspect camouflage every day IAW SOP?	**Y**	**N**	**TBD**
	Is an air guard, who knows the warning procedure, on watch for aircraft and UAS?			
2.	**Marines.** Is every Marine's helmet camouflaged? Attachments too?			
	Is every Marine's bivouac or fighting position camouflaged? Are packs camouflaged?			
3.	**Vehicles.** Is every vehicle off, covered with a camouflage net, flush to the ground?			
	Is every vehicle dispersed, irregularly, at least three vehicle lengths from the next?			
4.	Is the **Command Post** camouflaged so it will NOT be targeted?			
	Are the elements (and antennas) of the CP dispersed?			
	Tents. Is every CP tent covered with a camouflage net, flush to the ground?			
	Or **buildings**. Do CP buildings look ordinary so they will NOT be targeted?			
5.	Are the **Supply Points** camouflaged so they will NOT be targeted?			
	Are the separate supply points dispersed?			
	Tents. Are all supplies or pallets covered with a camouflage net, flush to the ground?			
	Or **buildings.** Do supply buildings look ordinary so they will NOT be targeted?			
6.	**Unit.** Is the unit's overall position camouflaged well enough NOT to be targeted?			
	Have piles of earth (spoil) been masked so that they are NOT visible from the air?			
	Have vehicle tracks been masked so they are NOT visible from the air?			
	Was **light discipline** good last night? Were lights from vehicles and the CP masked?			
	Is **trash discipline** good? Have trash bags, dunnage, and debris been hidden?			
	Summary:			



Chapter 4

Understand

In this Chapter

- Understanding adversary sensors
- Understanding adversary indirect fire weapons

SIGMAN Camouflage SOP:
Chapter 4: Understand

www.warfighting.us

Understand

Adversary UAS

Purpose. To identify sources of information to understand adversary UAS.

Process

1. ASK the S-2 for adversary UAS intelligence.

2. SEARCH the classified U.S. intelligence sites on SIPR:

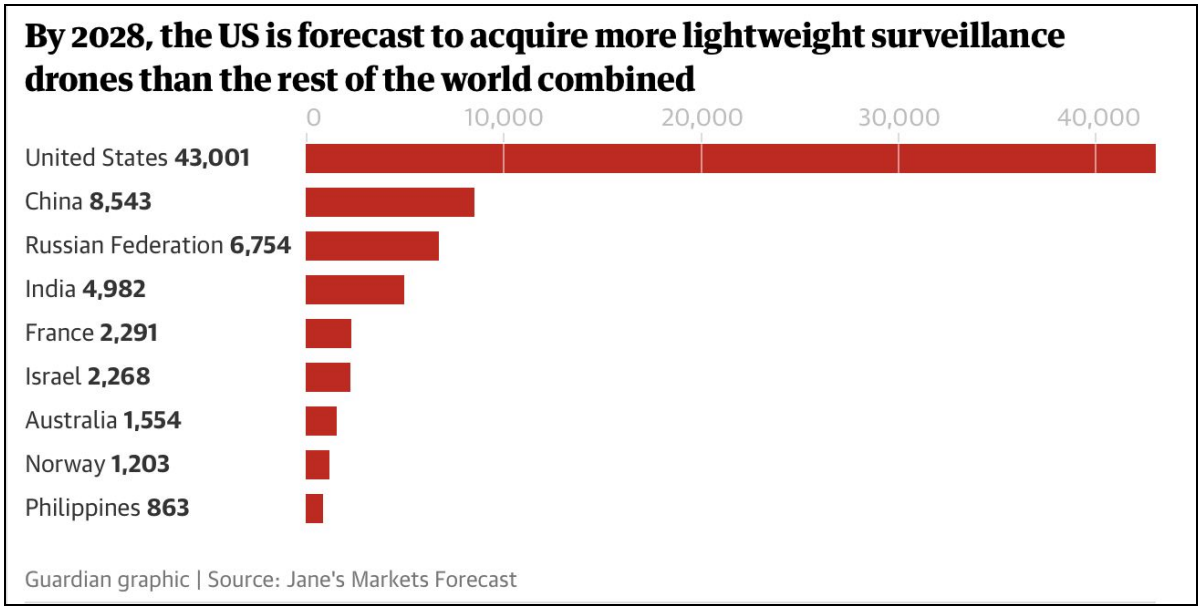
   NGIC (U.S. Army) provides intelligence on foreign ground forces.
   NASIC (U.S. Air Force) provides intelligence on foreign air and space forces.
   ONI (U.S. Navy) provides intelligence on foreign naval forces.

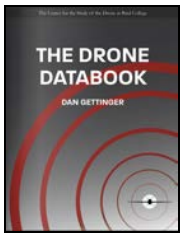
3. SEARCH the web for evolving UAS capabilities and UAS imagery.
   See the **TRADOC** ODIN Worldwide Equipment Guide.

4. UNDERSTAND UAS **terms**. UAS groups 1 through 5 are defined by the Joint UAS COE CONOPS V1.5, 2008. Low, slow, and small (LSS) UAS, which include micro- and mini-UAS are defined by ATP 3-01.81 *C-UAS Techniques*, 13 Apr 2017.

<table>
<tr><th>UAS Groups</th><th>Maximum Weight (lbs) (MGTOW)</th><th>Normal Operating Altitude (ft)</th><th>Speed (kts)</th><th colspan="2">Representative UAS</th></tr>
<tr><td>Group 1</td><td>0 – 20</td><td><1200 AGL</td><td>100</td><td>Raven (RQ-11),
WASP</td><td>  </td></tr>
<tr><td>Group 2</td><td>21 – 55</td><td><3500 AGL</td><td rowspan="2">< 250</td><td>ScanEagle</td><td>  </td></tr>
<tr><td>Group 3</td><td>< 1320</td><td rowspan="2">< FL 180</td><td>Shadow (RQ-7B),
Tier II / STUAS</td><td>  </td></tr>
<tr><td>Group 4</td><td rowspan="2">>1320</td><td rowspan="2">Any Airspeed</td><td>Fire Scout (MQ-8B, RQ-8B),
Predator (MQ-1A/B),
Sky Warrior ERMP (MQ-1C)</td><td>  </td></tr>
<tr><td>Group 5</td><td>> FL 180</td><td>Reaper (MQ-9A),
Global Hawk (RQ-4),
BAMS (RQ-4N)</td><td>  </td></tr>
</table>

5. UNDERSTAND UAS proliferation.





The Drone Databook. By Dan Gettinger. Annandale-on-Hudson, NY: Bard College, 2019.
dronecenter.bard.edu

Use of UAS by the world's militaries has doubled since 2010. Gettinger lists over 100 separate systems used by over 100 countries.

6. UNDERSTAND **ISIS** UAS.

The Islamic State and Drones: Supply, Scale, and Future Threats. By Don Rassler. West Point, NY: U.S. Military Academy, 2018. **www.ctc.usmc.edu**

Many insurgent groups may replicate what ISIS did to acquire, arm, and employ commercial UAS.

6 June 2020

Understand

Adversary Satellites

Purpose. To identify sources of information to understand adversary satellites.

Process

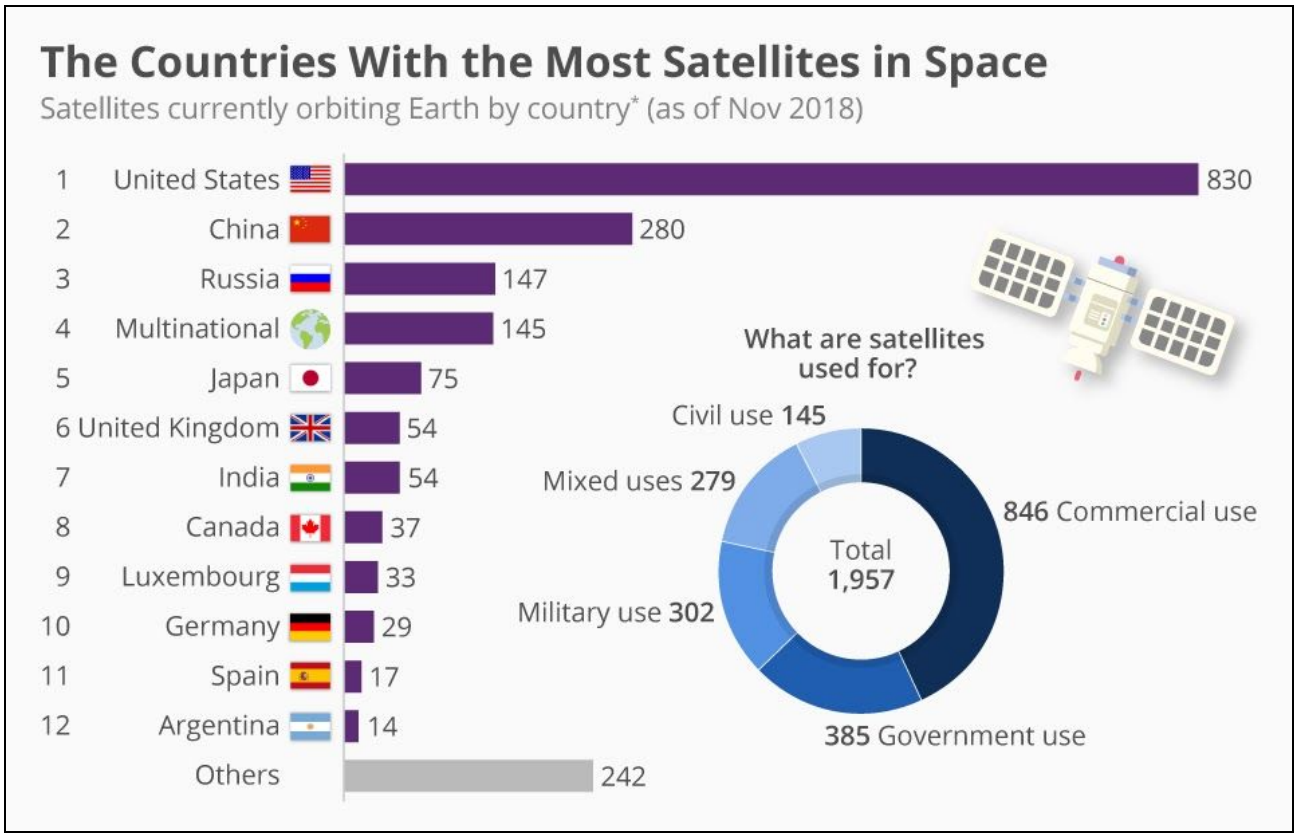
1. ASK the S-2 for adversary satellite intelligence.

2. SEARCH the classified U.S. intelligence sites on SIPR:

   NASIC (U.S. Air Force) provides intelligence on foreign air and space forces.

3. SEARCH the web for evolving satellite capabilities.

4. UNDERSTAND satellite proliferation.



Source: Union of Concerned Scientists Satellite Database.

5. UNDERSTAND satellite threats. When are adversary satellites collecting on *your* unit in *your* AO? When is your window of vulnerability? What types of units, ships, facilities, and equipment are most vulnerable to satellite collection? What sensors are being used? How can those sensors be mitigated?

6. UNDERSTAND U.S. signatures.

Satellite image of Camp Leatherneck, Helmand Province, Afghanistan.

6 June 2020

Understand

Adversary Missiles

Purpose. To identify sources of information to understand missile threats at the tactical level: terms, weapons, and capabilities.

Process

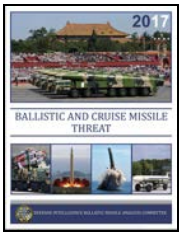
1. ASK the S-2 for adversary missile intelligence.

2. SEARCH the classified U.S. intelligence sites on SIPR:

   NGIC (U.S. Army) provides intelligence on foreign ground forces.
   NASIC (U.S. Air Force) provides intelligence on foreign air and space forces.
   ONI (U.S. Navy) provides intelligence on foreign naval forces.

3. SEARCH the web for evolving missile capabilities.
   See the **TRADOC** ODIN Worldwide Equipment Guide.

4. UNDERSTAND adversary missile types.



2017 Ballistic and Cruise Missile Threat. Wright-Patterson AFB, OH: NASIC / DIMBAC, 2017. 40 pages. **nasic.af.mil**

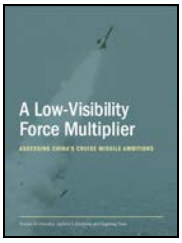
Explains ballistic missiles (CRBM, SRBM, MRBM, IRBM, ICBM), submarine and ship-launched ballistic missiles (SLBM, ShLBM), land attack cruise missiles (LACM), and anti-ship cruise missiles (ASCM).

5. UNDERSTAND adversary missile capabilities.

Missile Defense Project, Washington, DC: Center for Strategic and International Studies (CSIS). **csis.org**

A library of missile references, analyses, budgets, studies, and adversary inventories: **Missiles of Russia**, **Missiles of China**, **Missiles of North Korea**, **Missiles of Iran**.

6. UNDERSTAND Chinese cruise missile capabilities.



A Low-Visibility Force Multiplier: Assessing China's Cruise Missile Ambitions. By Gormley, Erickson, and Yuan. Washington, DC: NDU Press, 2014. 196 pages. **ndupress.ndu.edu**

A detailed study of Chinese ASCM, LACM, and missile doctrine.

9 June 2020

Understand

Adversary Rockets, Artillery, and Mortars

Purpose. To identify sources of information to understand adversary rockets, artillery, and mortars.

Process

1. ASK the S-2 for adversary rocket, artillery, and mortar intelligence.

2. SEARCH the classified U.S. intelligence sites on SIPR:

   NGIC (U.S. Army) provides intelligence on foreign ground forces.
   NASIC (U.S. Air Force) provides intelligence on foreign air and space forces.
   ONI (U.S. Navy) provides intelligence on foreign naval forces.

3. SEARCH the web for evolving weapons capabilities.
   See the **TRADOC** ODIN Worldwide Equipment Guide.

4. UNDERSTAND the significance of the **Zelenopillya Rocket Attack**.

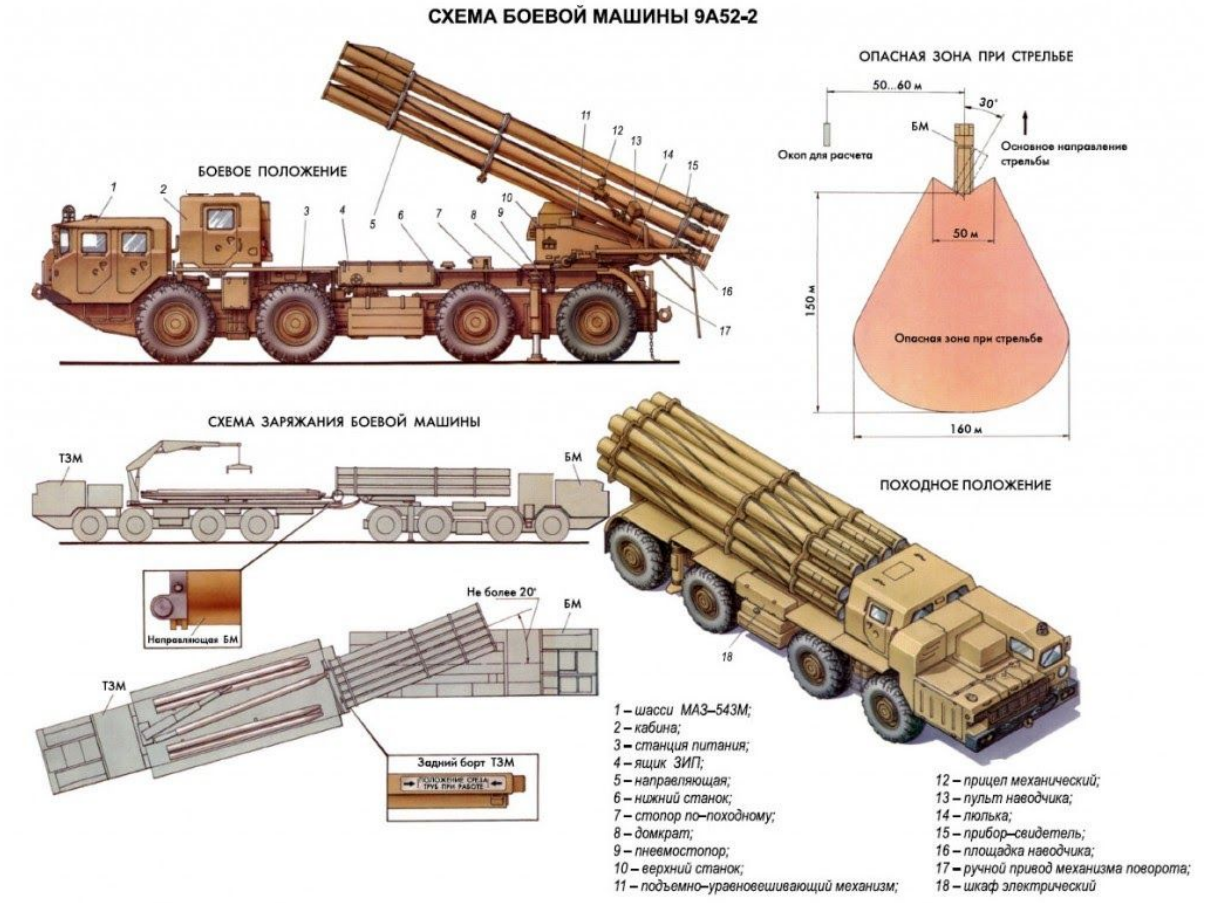
On 14 July 2014, two mechanized battalions of the Ukrainian Army, in an assembly area near Zelenopillya, Ukraine, were almost completely destroyed by a Russian rocket barrage.

The attack was conducted by **UAS**. The Russian rocket launchers, firing from inside Russian territory, were **Tornado-G** 122mm MLRS, an upgrade to the BM-21. The barrage included top-down anti-tank DPICM and thermobaric fuel-air explosives.

Over 100 other Russian rocket and artillery attacks followed during July and August 2014.

5. UNDERSTAND common **Russian** rocket, artillery, and mortar nomenclature.

System	Caliber	Range	
Common Russian Multiple Launch Rocket Systems (MLRS)			
BM-21	122mm	20 km	
BM-27	220mm	35 km	
BM-30	300mm	90 km	
9A52 Tornado is a new MLRS. It is separate from the **Tornado** upgrades to the BM-21, BM-27, and BM-30. The **Tornado 9A53-G** is the upgrade to the **BM-21**. Range is 40 km.			
Common Russian Self-Propelled (SP) Artillery			
2S1	122mm	15 km	
2S3	152mm	18 km	
Common Russian Towed Artillery			
D-30	122mm	15 km	
Common Russian Mortars			
2B11	82mm	7 km	



Russian BM-30 Smerch (9A52-2)

6. UNDERSTAND **UAS** integration with Russian artillery. Russia is fielding one UAS company to each brigade to support multiple artillery battalions.

"Integration of Unmanned Aerial Systems within Russian Artillery," by Lester Grau and Chuck Bartles, ***Fires***, May-June 2016, pp 31-38.

Direct overhead flight is the primary means of calling for fire with UAS at night: "Since terrain association with a thermal imager would be difficult… and the risk of the UAS being shot down at night is… reduced, it is likely the UAS operator uses the 'fly-over-the-target' method to fix the target."

5 June 2020

Understand

Adversary Naval Threats

Purpose. To identify sources of information to understand adversary naval capabilities.

Process

1. ASK the S-2 for adversary naval intelligence.

2. SEARCH the classified U.S. intelligence sites on SIPR:

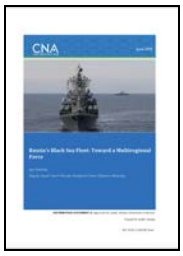
   NASIC (U.S. Air Force) provides intelligence on foreign air and space forces.
   ONI (U.S. Navy) provides intelligence on foreign naval forces.

3. SEARCH the web for evolving naval capabilities.
   See the **TRADOC** ODIN Worldwide Equipment Guide.

4. UNDERSTAND the Chinese Navy.

China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress. By Ronald O'Rourke. Washington, DC: Congressional Research Service (CRS) RL 33153, 21 May 2020.

5. UNDERSTAND the Russian Navy.



Russia's Black Sea Fleet: Toward a Multiregional Force. By Igor Delanoe. Arlington, VA: CNA, 5 Jun 2019. 36 pages.

30 Jun 2020

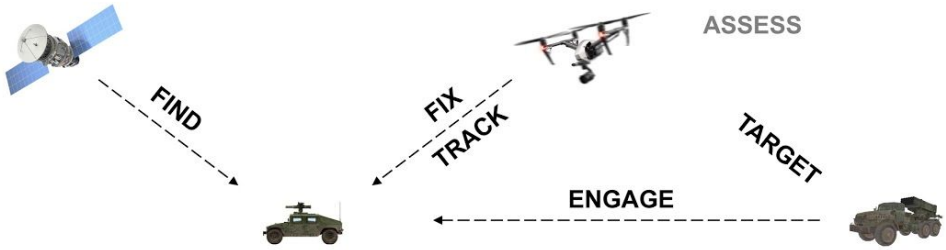
Understand

Adversary Fires Networks

Purpose. To identify sources of information to understand adversary reconnaissance and fire networks.

Process

1. UNDERSTAND the typical F2T2EA **kill chain** model.



FIND — An EM signal is detected and cues UAS. The FIND step can be done by any ISR: ground reconnaissance, SIGINT, HUMINT, ELINT, or MASINT.

FIX — UAS plots exact target location.

TRACK — UAS tracks location if target is moving.

TARGET — Adversary Tornado-G battery calculates range and targeting data.

ENGAGE — Adversary Tornado-G battery fires rocket barrages to destroy the target.

ASSESS — UAS, or other ISR asset, assesses BDA.

There are many combinations of equipment and units that can execute a kill chain.

2. UNDERSTAND Russian **reconnaissance fire networks**.

The Russian Reconnaissance Fire Complex Comes of Age. By Lester W. Grau and Charles K. Bartles. Oxford, England: University of Oxford, 30 May 2018.

The Russian Reconnaissance Strike Complex (RYK) links long-range weapons to intelligence and targeting for surface-to-surface missiles and aircraft-delivered "smart" munitions. The Reconnaissance Fire Complex (ROK) is the tactical equivalent for field artillery.

3. UNDERSTAND how to disrupt adversary **ISR** efforts.

	Eyes Day: Binoculars, Optics	**Eyes** Night: NVGs	**Eyes** Night: Thermal Scopes	**Ears** Day and Night	**UAS** Day: Visual Imagery	**UAS** Night: IR Thermal Imagery	**Aircraft** Day: Visual Imagery	**Aircraft** Night: FLIR Thermal Imagery	**Ground Radar** Day and Night: MTI	**SIGINT** Day and Night: DF	**Satellite** Day and Night: Imagery
Marines	Movement	Lights	Body Heat	Tools Voices	Movement	Body Heat	Movement	Body Heat			
Positions	Movement, Spoil	Lights, Fires	Fires, Stoves	Tools Voices	Movement, Spoil	Fires, Stoves	Movement, Spoil	Fires, Stoves	Metal Weapons	Radios	Contrast
Vehicles	Vehicles, Tracks	Lights	Engines	Engines	Vehicles, Tracks	Engines	Vehicles, Tracks	Engines	Metal Vehicles	Radios	Vehicle Patterns
CPs	Tents, Facilities	Lights	Equipment, Generators	Engines, Generators	Tents, Facilities	Equipment, Generators	Tents, Facilities	Equipment, Generators	Metal Vehicles	Radios, Generators	Vehicle Patterns
AAs	Vehicles, Tracks	Lights	Engines, Generators	Engines, Generators	Vehicles, Tracks	Engines, Generators	Vehicles, Tracks	Engines, Generators	Metal Vehicles	Radios	Vehicle Patterns
Buildings	Movement, Traffic	Lights			Movement, Traffic		Movement, Traffic			Radios	Vehicle Patterns
Camouflage Discipline:	**LIGHT Discipline**	**HEAT Discipline**	**NOISE Discipline**	**EMCON**	**METAL**						

Light discipline disrupts visual ISR. The human eye can see a campfire at 8 km, and vehicle lights at 20 km.
Heat discipline disrupts IR thermal ISR.
Noise discipline disrupts direct observation (listening) by ground reconnaissance units.
EMCON disrupts adversary SIGINT collection efforts.

4. UNDERSTAND how to disrupt adversary **NVGs**.

   NVGs are image intensifiers. They take existing light—from the stars, the moon, and from manmade illumination—and magnify it.

   To disrupt adversary NVGs, PLAN operations at critical times. KNOW the hours of *moonrise (MR)* and *moonset (MS)*, and the percent of *lunar illumination*.

   This information is available worldwide at: https://weather.af.mil/AFW_WBS/ (NIPR/CAC) and https://weather.af.smil.mil/AFW_WEBS/ (SIPR).

   A 20% moon, positioned at 30 degrees above the horizon provides 0.022 lux. Less than this amount of light is called *low light*. A full moon is ten times brighter than a new moon.

5. UNDERSTAND how to disrupt adversary **IR thermal** sensors.

   To disrupt adversary IR thermal sensors, PLAN operations at critical times. KNOW the hours of *BMNT*, *sunrise (SR)*, *EENT* and *sunset (SS)*.

   This information is available worldwide at: https://weather.af.mil/AFW_WBS/ (NIPR/CAC) and https://weather.af.smil.mil/AFW_WEBS/ (SIPR).

Thermal crossover times differ—because each piece of equipment heats and cools at different rates—but they generally occur near sunrise and sunset.

6. UNDERSTAND how to disrupt adversary **radar**.

   A moving target indicator (MTI) picks up metal. Vehicles in the open can be detected by air or ground MTI at 20 kilometers. Convoys moving on covered routes can disrupt their metal signature. Camouflage netting, when kept two feet off the metal surface, can disrupt the radar signatures of vehicles. Conex boxes, infantry weapons, and metal ammunition cans can be vulnerable to air and ground radars.

30 June 2020

Understand

U.S. Air and Missile Defense (AMD)

Purpose. To identify sources of information. All leaders should have a basic understanding of U.S. Air and Missile Defense (AMD) terms, weapons, and capabilities.

Process

1. UNDERSTAND **Joint** AMD terms.

   The Joint Force Commander (JFC) is responsible for AMD. The JFC appoints an Area Air Defense Commander (AADC), who establishes an integrated air defense system (IADS) and writes the Area Air Defense Plan (AADP). The Joint Force Air Component Commander (JFACC) executes the AADP. Only the AADC can delegate engagement authority to tactical units to shoot at adversary aircraft and missiles.

   Air and Missile Defense (AMD) consists of **Air Defense** (AD) - against aircraft, UAS, and cruise missiles - and **Ballistic Missile Defense** (BMD).

2019 Missile Defense Review. Washington, DC: Secretary of Defense, 2019. 108 pages.

Summarizes evolving missile threats and describes U.S. missile defense capabilities, including GMD, THAAD, Aegis, and Patriot PAC-3.

JP 3-01 ***Countering Air and Missile Threats***, 2 May 2018. 169 pages.

Defines joint terms for AMD. Describes key roles in the AMD command and control structure. Discusses offensive and defensive AMD planning, homeland security, and global missile defense.

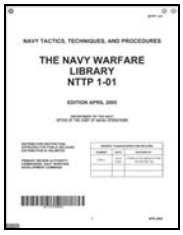
ATP 3-01.15 / MCTP 10-10B ***AMD: Multi-Service TTPs for Air and Missile Defense***, 14 Mar 2019. 188 pages.

A comprehensive source for Joint and service AMD equipment, C2, and doctrine, with a separate chapter for each service. JIPOE for AMD, UAS challenges, planning checklists, and an AADP template.

2. UNDERSTAND **Navy** AMD terms.

   In the Navy's Composite Warfare Commander (CWC) construct, the Air Missile Defense Commander (AMDC) defends the force against airborne weapons launched from aircraft,

ships, submarines, and land-based sites. The Ballistic Missile Defense Commander (BMDC) defends the force from ballistic missiles.



NTTP 3-01.11 ***Maritime Air and Missile Defense Planning***, 1 Apr 2015.

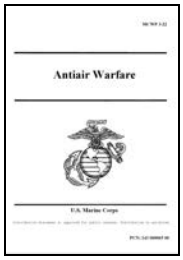
The Navy's Aegis weapons system tracks and engages incoming missiles. Aegis integrates air and missile defense weapons, as well as ASW torpedoes and Tomahawk LACM.

3. UNDERSTAND **Marine Corps** antiair warfare terms.

The ACE protects the MAGTF. The ACE is not expected to contribute to the Joint AADP. Antiair warfare, primarily conducted by aircraft, is one of the six functions of Marine aviation. Marine LAAD units, with AD weapons but no radar, provide local air defense.

Marine Aviation Weapons and Tactics Squadron One (MAWTS-1), Yuma, AZ.

The MAWTS-1 website, and the antiair curriculum, is FOUO on SIPR.



MCTP 3-20C ***Antiair Warfare***, 4 Apr 2018. 92 pages.

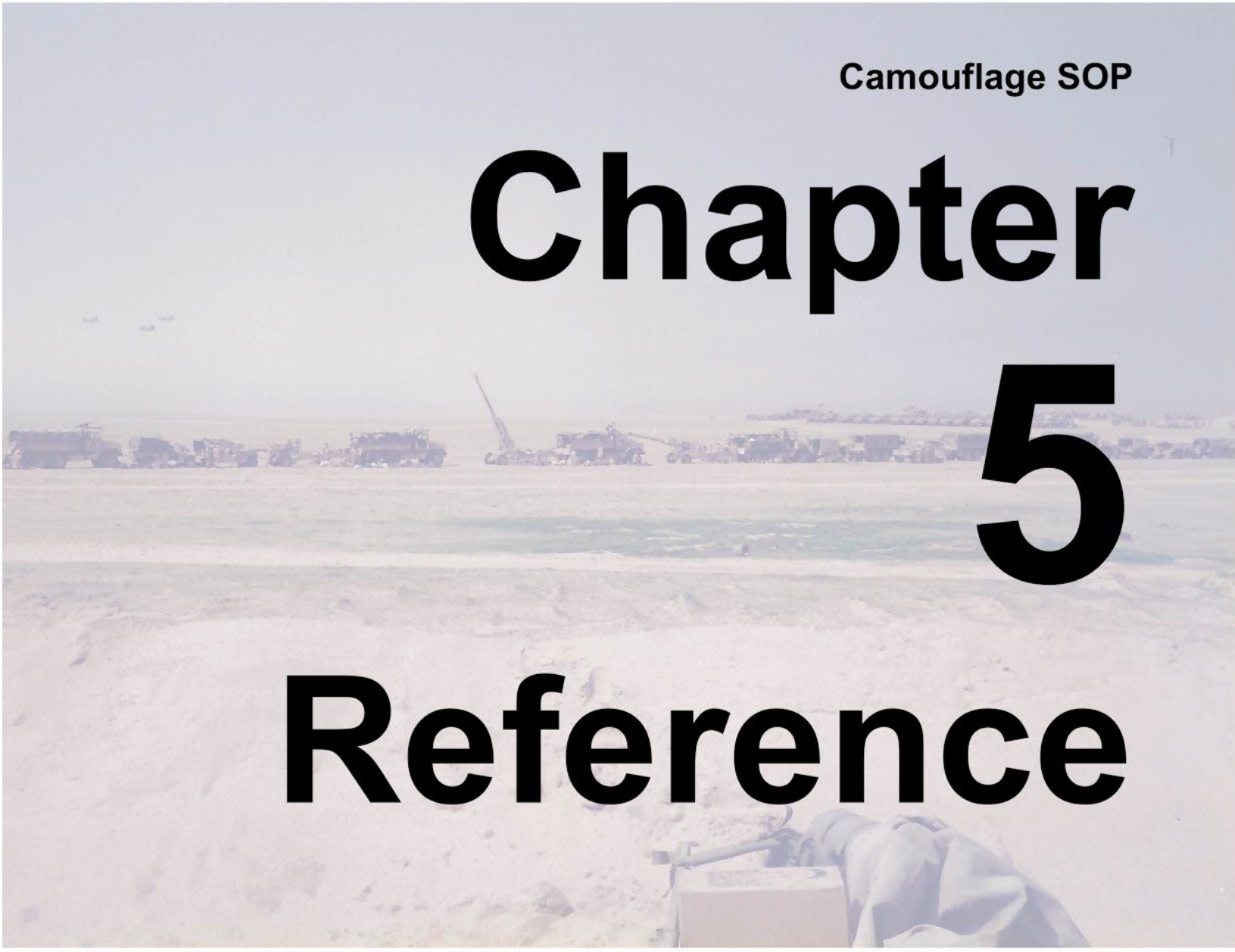
Describes Marine antiair units and procedures.
Out-of-date. Written in 1999, with no discussion of adversary UAS.

4. UNDERSTAND passive air defense TTPs for ground units.

ATP 3-01.8 ***Techniques for Combined Arms for Air Defense***, 29 Jul 2016. 68 pages.

Ground combat units conduct passive air defense: dispersion, camouflage, and concealment. Are air defense warnings (ADW red, ADW yellow, ADW white) still relevant under adversary UAS observation?

5 June 2020



Chapter 5 Reference

In this Chapter

- Glossary
- Bibliography
- UAS Imagery

SIGMAN Camouflage SOP:
Chapter 5: Reference

www.warfighting.us

Reference

Glossary

Purpose. To collect standardized definitions for SIGMAN and camouflage terms.

A2/AD — Anti-access and area denial. *An imprecise term banned by the CNO in 2016.*

> **A2** (antiaccess) — Action, activity, or capability, usually long-range, designed to prevent an advancing enemy force from entering an operational area (*DOD Dictionary*, 1 Jan 2020).

AD (air defense) — Defensive measures designed to destroy attacking enemy aircraft or aerodynamic missiles, or to nullify or reduce the effectiveness of such attack (*DOD Dictionary*, 1 Jan 2020).

> **active air defense**. REMOVED from JP 3-01 and *DOD Dictionary*.
>
> **passive air defense**. REMOVED from JP 3-01 and *DOD Dictionary*.

ADWC (air defense warning condition) — An air defense warning given in the form of a color code corresponding to the degree of air raid probability with yellow standing for when an attack by hostile aircraft or missiles is probable; red for when an attack by hostile aircraft or missiles is imminent or is in progress; and white for when an attack by hostile aircraft or missiles is improbable (*DOD Dictionary*, 1 Jan 2020).

AMD (air and missile defense) — Direct [active and passive] defensive actions taken to destroy, nullify, or reduce the effectiveness of hostile air and ballistic missile threats against friendly forces and assets (*DOD Dictionary*, 1 Jan 2020).

BM (ballistic missile) — Any missile that does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated (*DOD Dictionary*, 1 Jan 2020).

> **CRBM** (close-range ballistic missile) — A land-based ballistic missile with a range capability up to 300 nautical miles (*DOD Dictionary*, 1 Jan 2020).
>
> **SRBM** (short-range ballistic missile) — A ballistic missile with a range capability between 300-600 nautical miles (*DOD Dictionary*, 1 Jan 2020).
>
> **MRBM** (medium-range ballistic missile) — A ballistic missile with a range capability from about 600 to 1,500 nautical miles (*DOD Dictionary*, 1 Jan 2020).
>
> **IRBM** (intermediate-range ballistic missile) — A ballistic missile with a range capability from 1,500 to 3,000 nautical miles (*DOD Dictionary*, 1 Jan 2020).
>
> **ICBM** (intercontinental ballistic missile) — A long-range ballistic missile with a range capability greater than 3,000 nautical miles (*DOD Dictionary*, 1 Jan 2020).
>
> **SLBM** — submarine-launched ballistic missile (*DOD Dictionary*, 1 Jan 2020).
>
> **SuLBM** — surface-launched ballistic missile.

BMD — ballistic missile defense (*DOD Dictionary*, 1 Jan 2020).

TBMD — theater ballistic missile defense (*DOD Dictionary*, 1 Jan 2020).

BMNT (begin morning nautical twilight) — The start of the period where, in good conditions and in the absence of other illumination, the sun is 12 degrees below the eastern horizon and enough light is available to identify the general outlines of ground objects and conduct limited military operations (*DOD Dictionary*, 1 Jan 2020) (This definition should specify the “center of the sun.” The term “first light” is NOT used and has been dropped from the *DOD Dictionar*y).

BP (battle position) — 1. In ground operations, a defensive location oriented on an enemy avenue of approach from which a unit may defend. 2. In air operations, an airspace coordination area containing firing points for attack helicopters (MCRP 1-10.2 *Marine Corps Supplement*, 31 May 2018).

battle drill — A critical collective action or task performed by a platoon or smaller element without the application of a deliberate decision-making process, initiated on cue, accomplished with minimal leader orders, and performed to standard throughout like units (MCRP 1-10.2 *Marine Corps Supplement t*, 31 May 2018).

CCD — camouflage, concealment, and deception (*DOD Dictionary*, 1 Jan 2020).

CM (cruise missile) — A guided and powered missile that flies at constant speed for the majority of its route and relies upon aerodynamic forces for lift (*DOD Dictionary*, 1 Jan 2020).

LACM — Land-attack cruise missile (NO DOD or USMC definition).

ASCM — Anti-ship cruise missile (NO DOD or USMC definition).

CMD — cruise missile defense (*DOD Dictionary*, 1 Jan 2020).

C-UAS — counter-unmanned aircraft system (*DOD Dictionary*, 1 Jan 2020).

camouflage — (NO DOD or USMC definition).

camouflage discipline

light discipline — (NO DOD or USMC definition).

heat discipline — (NO DOD or USMC definition).

noise discipline — (NO DOD or USMC definition).

trash discipline — (NO DOD or USMC definition).

movement discipline — (NO DOD or USMC definition).

concealment — The protection from observation or surveillance (MCRP 1-10.2 *Marine Corps Supplement*, 31 May 2018) (NO DOD definition).

cover — 4. Protection from the effects of direct and indirect fire. It can be provided by ditches, caves, river banks, folds in the ground, shell craters, buildings, walls, and embankments (MCRP 1-10.2 *Marine Corps Supplement*, 31 May 2018) (NO DOD definition).

dead ground — Terrain not visible to the enemy and protected from enemy direct fires.

defilade — 1. Protection from hostile observation and fire provided by an obstacle such as a hill, ridge, or bank. 2. A vertical distance by which a position is concealed from enemy observation. 3. To shield from enemy fire or observation by using natural or artificial obstacles (*DOD Dictionary*, 1 Jan 2020).

dispersal — Relocation of forces for the purpose of increasing survivability (*DOD Dictionary*, 1 Jan 2020).

dispersion — 1. The spreading or separating of troops, material, establishments, or activities, which are usually concentrated in limited areas to reduce vulnerability (*DOD Dictionary*, 1 Jan 2020).

disrupt — 1. To integrate fires and obstacles to break apart an enemy's formation and tempo, interrupt the enemy's timetable, or cause premature commitment or the piecemealing of enemy forces. 2. To preclude the efficient interaction of enemy combat or combat support systems (MCRP 1-10.2 *Marine Corps Supplement*, 31 May 2018) (NO DOD definition).

EENT (end evening nautical twilight) — The point in time when the sun has dropped 12 degrees below the western horizon, and is the instant of last available daylight for the visual control of limited military operations. (*DOD Dictionary*, 1 Jan 2020) (This definition should specify the "center of the sun").

F2T2EA — find, fix, track, target, engage, and assess (*DOD Dictionary*, 1 Jan 2020).

FLIR (forward-looking infrared) — An airborne, electro-optical, thermal imaging device that detects far-infrared energy, converts the energy into an electronic signal, and provides a visible image for day or night viewing (*DOD Dictionary*, 1 Jan 2020).

IFPC (indirect fire protection capability) — IFPC Increment 2-Intercept (IFPC Inc 2-I) is a mobile, ground-based weapon system designed to acquire, track, engage and defeat Unmanned Aircraft Systems (UAS), Cruise Missiles (CM) and Rockets, Artillery and Mortars (RAM).

ISR — intelligence, surveillance, and reconnaissance — 1. An integrated operations and intelligence activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. 2. The organizations or assets conducting such activities (*DOD Dictionary*, 1 Jan 2020).

kill chain — In dynamic targeting, the steps and procedures involved to find, fix, track, target, engage, and assess (F2T2EA) a target (JP 3-09 *Joint Fire Support*, 10 Apr 2019)(NO DOD or USMC definition).

LCSS — lightweight camouflage screen system (MCRP 1-10.2 *Marine Corps Supplement*, 31 May 2018).

low light — Light level less than 0.0022 lux. Other than low light is light level greater than or equal to 0.0022 lux (CNAF M-3710.7 *NATOPS*, 5 May 2016).

LLL (low light level) — < 0.0022 lux (NO DOD or USMC definition).

HLL (high light level) — > 0.0022 lux (NO DOD or USMC definition).

LSS — low, slow, small UAS (ATP 3-01.81 *C-UAS Techniques*, 13 Apr 2017).

lunar illumination — Given in percentage of the actual lunar disk visible at midnight of each given day (MCRP 2-10.6 *MAGTF Meteorological and Oceanographic Support*, 4 Apr 2018) (Lunar illumination is reduced by cloud cover and weather. Lunar illumination is NOT the percentage of illuminated hours of a given night. A full moon below the horizon provides zero illumination).

lux — Luminous flux per unit area, measured as one lumen per square meter (SI). Sunrise is approximately 400 lux (U.S. Naval Observatory: https://aa.usno.navy.mil)..

micro-terrain — Small folds in the ground that provide protection from observation and enemy fire (NO DOD or USMC definition).

MR (moonrise) — The instant when the upper edge of the moon appears on the sea-level horizon (MCRP 2-10.6 *MAGTF Meteorological and Oceanographic Support*, 4 Apr 2018).

MS (moonset) — The instant when the upper edge of the moon disappears below the sea-level horizon (MCRP 2-10.6 *MAGTF Meteorological and Oceanographic Support*, 4 Apr 2018).

multispectral — Of or relating to two or more ranges of frequencies or wavelengths in the electromagnetic spectrum (*Merriam-Webster*, 2020).

RAM — Rockets, artillery, and mortars.

RRP (repair and replenishment point) — A combat service support installation, normally in forward areas near the supported unit, established to support a mechanized or other rapidly moving force. It may be either a prearranged point or a hastily selected point to rearm, refuel, or provide repair services to the supported force (MCRP 1-10.2 *Marine Corps Supplement*, 31 May 2018).

RSTA — reconnaissance, surveillance, and target acquisition (*DOD Dictionary*, 1 Jan 2020).

sensor — 1. A device that responds to a physical stimulus (such as heat, light, sound, pressure, magnetism, or a particular motion) and transmits a resulting impulse (as for measurement or operating a control) (*Merriam-Webster*, 2020).

shadow

cast shadow — A cast shadow is a silhouette of an object projected against its background. It is the more familiar type of shadow and can be highly conspicuous. In desert environments, a shadow cast by a target can be more conspicuous than the target itself (ATP 3-37.34 / MCTP 3-34C *Survivability Operations*, 16 Apr 2018) (NO DOD definition).

contained shadow — a contained shadow is the dark pool that forms in a permanently shaded area. Examples are the shadows under the track guards of an armored fighting vehicle, inside a slit trench, inside an open cupola, or under a vehicle. Contained shadows show up much darker than their surroundings and are easily detected by an enemy (ATP 3-37.34 / MCTP 3-34C *Survivability Operations*, 16 Apr 2018) (NO DOD definition).

signature — A characteristic of an indicator that makes it identifiable (*Marine Corps Concept of Signature Management*, 24 Oct 2017) (NO DOD or USMC definition).

physical signature — Physical signatures are those that can be collected by adversary geospatial-intelligence assets or through direct observation (*Marine Corps Concept of Signature Management*, 24 Oct 2017) (NO DOD or USMC definition).

administrative signature — Administrative signatures are those that an individual or unit creates when conducting planning, movement, contracting, or other administrative actions and that can be collected on by adversary Open Source Intelligence (OSINT), Signals Intelligence (SIGINT), or human source intelligence (HUMINT) (*Marine Corps Concept of Signature Management*, 24 Oct 2017) (NO DOD or USMC definition).

technical signature — Technical signatures are those that can be collected by adversary signal intelligence (SIGINT) assets (*Marine Corps Concept of Signature Management*, 24 Oct 2017) (NO DOD or USMC definition).

SIGMAN (signature management) — The process by which we understand own-force signatures and indicators, identify methods and capabilities to collect and analyze those signatures, develop and implement countermeasures to mask those signatures; and when necessary develop and implement methods to project false signatures which protect friendly forces from adversary exploitation; or to draw the adversary toward a specific course of action or position of disadvantage (*Marine Corps Concept of Signature Management*, 24 Oct 2017) (NO DOD or USMC definition).

SUAS — Small UAS.

SR (sunrise) — The instant when the upper edge of the sun appears on the sea-level horizon (MCRP 2-10.6 *MAGTF Meteorological and Oceanographic Support*, 4 Apr 2018).

SS (sunset) — The instant when the upper edge of the sun disappears below the sea-level horizon (MCRP 2-10.6 *MAGTF Meteorological and Oceanographic Support*, 4 Apr 2018).

TAA (tactical assembly area) — An area that is generally out of the reach of light artillery and the location where units make final preparations (pre-combat checks and inspections) and rest, prior to moving to the line of departure (*DOD Dictionary*, 1 Jan 2020).

TAC-D (tactical deception) — Deception executed by tactical commanders not necessarily linked to a higher MILDEC plan (NO DOD or USMC definition).

thermal crossover — The natural phenomenon that normally occurs twice daily when temperature conditions are such that there is a loss of contrast between two adjacent objects on infrared imagery (*DOD Dictionary*, 1 Jan 2020).

UAS — Unmanned aircraft system (*DOD Dictionary*, 1 Jan 2020).

ULCANS — Ultra-lightweight camouflage net system.

WEZ (weapon engagement zone) — In air and missile defense, airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with a particular weapon system (*DOD Dictionary*, 1 Jan 2020).

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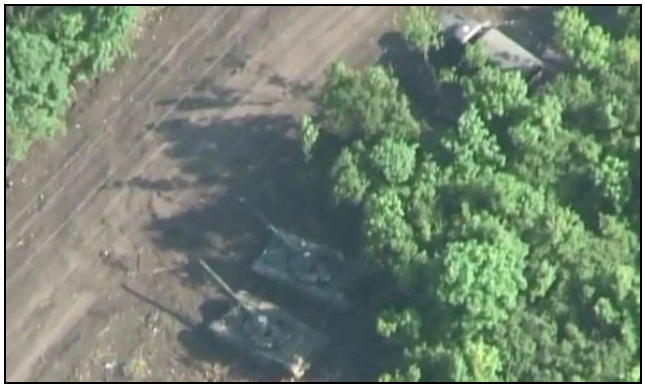

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UAS Imagery of Marine Units

Purpose. To understand what UAS can see.

Infantry battalion **TAA** from 2014 ft MSL.

Infantry Company **CP** from 1519 ft MSL.

Infantry, on road in daylight, from 1483 ft MSL.

Infantry, on road at night, from 1404 ft MSL.

Vehicles dispersed, from 1499 ft MSL.

Vehicles raising dust, from 817 ft MSL.

Good effort at concealment in the treeline, but netting does NOT match background. From 1178 ft MSL.

Good effort at concealment, but square, shiny tarps do NOT match background. From 1453 ft MSL.

Good effort. Tan uniforms blend with background. From 935 ft MSL.

Good effort. Mortar section is undetectable. From 1548 ft MSL.

Synthetic sandbags shine “like light bulbs.” From 100 ft AGL.

Contained shadows make fighting positions visible. From 500 ft AGL.

Notes

1. **Patterns**—rows of vehicles, tents, packs, pallets, or tarps—are easily seen from the air.

2. **Roads** are easily viewed from the air. Shadows and dark uniforms contrast with light-colored roads. After dusk, the road retains heat.

3. **Vehicles** are easily seen from the air. Even when dispersed in foliage, vehicles still need camouflage netting. Vehicles on dirt roads raise dust clouds.

4. Vehicle **tracks**—in grass, dirt, or sand—are easily seen from the air. Tracks are difficult to avoid or erase.

5. Square, shiny **tarps** are easily seen from the air. Tarps often do NOT blend with the background.

6. Synthetic **sandbags**—reflecting sunlight—are easily seen from the air.

7. Contained **shadows**—in fighting positions and vehicle netting—are easily seen from the air.

8. Marines in building **windows** are easily seen from the air with IR thermal sights.

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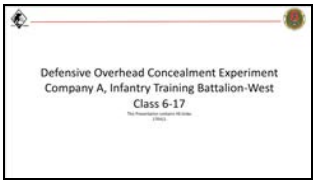

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SIGMAN Camouflage SOP:
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