THE FIELDCRAFT BOOK

Chad Skaggs, Editor
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This is a reference work and should not be construed as an official publication, field manual or doctrinal publication.

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Introduction

Purpose

It took me years to learn how to live in the field. As a junior Marine, I looked to the old hands, the 20+ year guys. *The Fieldcraft Book*—combined with a healthy dose of experimentation—is the result of that search.

While *The Fieldcraft Book* does not seek to replicate information, it does seek to consolidate information. It is meant to gather best practices, tips, tricks and methods. It perpetuates tribal knowledge that is not taught in formal schools. It is not a restatement of procedures in field manuals and technical manuals, but references certain portions frequently overlooked.

This manual remains a draft, and will be regularly updated as techniques and procedures evolve. Send questions, comments, ideas and concerns to Skaggs.chad@gmail.com.

Scope

Fieldcraft is often limited to camouflage only. *The Fieldcraft Book* widens the aperture of 'fieldcraft' to encompass tips, tricks, and techniques that allow Infantry Marines to better live in the field and efficiently complete tasks.

Thanks

Some people warrant merit. I wouldn't be writing this if it weren't for Gunner Jimmy Hussey. For each infantry battalion there is *a* Gunner. Jimmy Hussey is *The* Gunner. He is the first one that took an active role in my education. This book is the result. Brendan McBreen weighed heavily in this endeavor. For many years, he was a candle in the dark for capturing and promulgating infantry best practices. His work is extensively used and cited here. He is a great friend, and invaluable mentor. Captain Garrett Boyce, Major Ian Brown, Damien O'Connell, Captain Christopher Howard and Staff Sergeant Joe Blair deserve special note. They are colleagues, co-conspirators, and dear friends.

Finally, my wife Kerri. As with most military spouses, she bears the most and is recognized least. Nothing would be possible without her.

Contributors

This book is the result of the contributions of the Marines below. Accolades are theirs. All errors are mine.

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The Marines of K/3/7
The Marines of G/2/4
The Marines of B/3D LAR

Foreward

Fieldcraft—those skills needed to fight, move, operate, and live in the field—is the mark of professional armies throughout history. If you study the photographs of successful combat units over the last century—including our own Marine Corps—you can see with your own eyes the field skills of well-led and well-trained warriors.

Fieldcraft has always been a Marine Corps strength. But not all Marines were true believers. On Guadalcanal in 1942, our best battalions splashed ashore with jungle skills, waterproof maps, and camouflage helmets. These hard-fighting units were led by experienced Marines who had fought in Central America before the war. Other units—whose leaders had spit-and-polish priorities acquired on parade duty in China—were less prepared for combat.

Fieldcraft is tactical. Units that know how to fight know how to employ their weapons, prepare their positions, camouflage, infiltrate, navigate, and communicate in all weathers and in difficult terrain. In the open desert, some field skills may be less important, but in close terrain, where Marine units are most lethal and relevant, fieldcraft is paramount.

Fieldcraft is expeditionary. Marines do more with less. Deployed around the world, we thrive on austerity and innovation. Our ethos and *Warfightin*g doctrine emphasize readiness—of lean, rugged, resilient units that know how to operate, and how to fight, in any clime and place.

Fieldcraft is a Marine skill, taught through practical example by tough, competent and experienced Marine NCOs. It is absolutely fitting that a Marine Staff NCO has written this *Fieldcraft* manual, passing along the skills of the tribe.

Staff Sergeant Chad Skaggs has made a significant contribution to the Marine Corps. His work, experience, insights, and recommendations will benefit all Marines and make us a stronger, more combat-ready organization.

Lieutenant Colonel Brendan McBreen, USMC Retired
Suffolk, Virginia
28 October 2020

Standing Rules For the Infantryman

Your gear stays packed.
Check, Check, Re-Check.
Speed is fine; accuracy is final.
You only rate one thing: hard work.
You are always on the enemy's time.
All gear is silent, subdued, and secured.
Everything we do must be simple and effective.
Every Infantry Marine has a knife and a wrist watch.
Security is 360 degrees, continuous, and paramount.
You find your gear, silently, in the dark, without a flashlight.

Topic

Boots
- Cleaning
- Notes on Boots
- Put a Knot in your Boots
- Waterproofing
- Mickey Mouse Boots

How to Wear Leg Gaitors
How to do Field Laundry
How to Make a Knee Board
How to Stop Eye Pro from fogging up
How to Make Your Own Water Proofing Bags
Bungees for Nalgenes
The Camelbak Hydration Pouch
How to Stow Your Daypack Shoulder Straps
Lift the Suspension on Your Issued Ruck
How to Make a Better Dummy Cord
Store Water Sources Upside Down
How to Restore Your Gortex Waterproofing
Attaching Sleeping Bag to the Bivy Sack
Layering the Extreme Cold Weather Bag
and Compression Sack
Notes on Sleeping Systems
Notes on Socks
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Cleaning Your Boots

Clean your boots after each field evolution. Clean boots protect your feet, stay water repellent, and last longer.

To clean military boots, remove insoles and laces. Soak in a tub of warm water. Add regular dish detergent (i.e. Dawn). Lightly scrub with a bristled brush. Toothbrushes or dish brushes work well.

Ensure to clean crevices, and seams. Rinse several times to ensure all soap is removed.

Air dry out of direct sunlight.

Notes on Boots

Air out your boots often. Take out the insoles.

If your boots are soaked, stuff dirty socks in them to try to wick some of the water out overnight.

Buy after-market insoles.

Fix minor tears and separations in boot leather with super-glue or 'shoe goo.'

Bates Lite-style boots, while light weight, do not have a hard sole. They do not protect the foot from puncturing, and perform poorly on rough terrain. Reserve Bates Lites-style boots for jungle work. *Notes on Jungle Warfare (1942)* describes the necessity for lighter, softer-soled boots for jungle work.

Put a Knot in Your Laces

Putting a knot in the end of your boot laces will stop your Boots from becoming unlaced when you take them off.

A simple overhand knot does the trick.

Expedient Method to Water Proof Your Boots

To start, you need a candle or a ball of paraffin wax. Gently rub the wax along the seams, leaving a light coat. Once the seams are done, melt the wax. Candles, lighters, or a heat-gun work well. Do not burn the boot. Keep the heat source moving until the wax becomes runny.

Allow the wax to dry. The residual wax will be slightly shiny. Do not over apply, and be careful to not get too much wax on the leather. Pictures below are in order.

Note: This method is not authorized per MCO1020.34H, and is considered field expedient only.

“Mickey Mouse” Boots

Vapor Barrier Boots (commonly referred to as ‘Mickey Mouse Boots or VB Boots) are a boot made from a solid rubber outer shell. As such, they are incredibly waterproof and warm but not breathable. Your feet will sweat quite a bit.

As your feet sweat, wipe the inside of the boot at minimum once per day. Change your socks in conjunction with this; use your dirty socks to wipe out the inside of the boot.

To keep dry, place boots in your sleeping bag. It will dry them and keep the rubber pliable.

White VB Boots are rated 14° F to –60° F.

Some Mickey Mouse boots have a pressure release valve. This valve is to equalize pressure when altitude has rapidly changed. Otherwise, keep valve closed to prevent moisture from getting inside the boot’s multiple linings.

How to Wear Leg Gaiters

Leg gaiters are worn over the boot and trousers. They keep snow, mud and debris out of the boot. They are great kit. To wear:

The buckle goes on the outside; there is a ‘left’ and ‘right’. Ensure strap is under the heel. Seat the hook on the bridging lace. The Velcro strip should be to the front. Work the Velcro strip closed.

Tuck the loose end of the buckle into the strap. This prevents it from getting snagged on skis and snow-shoes. Velcro the top strap down.

Field Laundry

Austere environments force primitive living. Even if briefly rotated to a rear area, Marines clean uniforms and equipment. Laundry forward-deployed is as simple as a container (bucket, cooler), a washboard, and powder laundry detergent.

Fill container with water. Add laundry detergent. Vigorously scrub against washboard (below, right) or similar rough surface. Rinse. Hang to air dry.

Marines can clean uniforms in the field. Field expedient methods include sunning and dry scrubbing.

Sunning. Lay bedding or clothing out in the sun for 30 minutes. UV rays help kill bacteria and dry damp cloth.

Dry Scrubbing. Clothing and bedding is folded onto itself and rubbed together. Dried mud, sweat, and dead skin are scrubbed off of the items.

Make a Knee Board

Light weight, and with infinite uses, knee boards are valuable kit. Start with unused ISOMAT, purchased from the PX, or sourced from other means. Cut into an 18” square. Encapsulate in duct tape. This typically lives in the radio pouch of your ruck, or the internal hydration pouch of your day pack.

Knee boards are used for sitting, kneeling or laying to isolate your body from touching wet, cold, or rocky terrain. When used to lay on in the prone (as in ambushes) it can stave off the onset of hypothermia.

1

Stop Your Eye Pro From Fogging Up

Nothing is more annoying than your eye protection fogging up mid-operation. Here are some field expedient ways to delay the fog. Some of these methods are meant to be done during precombat checks, but some may be done 'on the fly'.

The method of defogging is the same for all the listed materials: apply material, rub it around with your finger or soft cloth, rinse until clear, and clean with a soft, non-scratching cloth. Commercial defogger is the best solution, but it may not be handy.

Materials you can use to temporarily defog eye protection:
Toothpaste
Baby Shampoo
Dishwashing Soap
Ivory Soap
Shaving Cream

Spit—the most expedient method— is not effective for very long.

Note: for each of these methods, a little bit goes a long way. Use only a drop or dab. Apply too much, and you will only make the situation worse.





Make Your Own Waterproofing Bags

The number of issued waterproofing bags are not adequate if you like to keep your gear compartmentalized. Additionally, if the issued bags are lost or ripped, they are expensive to replace.

Make your own. Start with a Ziploc bag of your choice size. Lay flat. Carefully layer duct tape, starting at the bottom, and layering at least 1/2 inch. One you are at the top, lay a piece sticky side up. Place another piece covering half of it. Fold down the stick portion, creating a 'flap' at the top.

Flip the bag over, and repeat on the other side. Once both sides are done, trim the excess of the edges. We use a lot of these. They are great for hygiene kits, instant coffee, and for compartmentalizing any other gear so that you are not digging through a giant waterproofing sack in the middle of the night.

Bungees for Nalgenes

One of the most useful items around are the bungee loops that are part of the issued tarp.

Using these bungees, tie them with a clove hitch around MOLLE loops on your daypack or ruck. Attach a small, cheap s-beaner to your Nalgene. Now, you can stow your Nalgenes in exterior pouches or in the pouches outside your ruck and not worry about loosing them.

The Camelback Hydration Pouch

As you drink water from your camelback, it has a tendency to 'fall down' into the hydration pouch. When this happens, it is difficult to get water through the hose, even though there is plenty of water in the camelback bladder.

The issued hydration pouches were designed with a small loop underneath the flap.

Locate this loop and slide your camelbak bladder 'hook' through it.

Now, as you drink, the bladder remains 'upright' and doesn't give you problems as you run low on water.

Day Pack Shoulder Straps

Stow the straps on your day pack to better attach it to the top of your ruck.

To Stow. Unclip the shoulder straps. Tuck straps from the top into the space on the back of the pack.

Roll waist strap and the bottom of the shoulder straps into the slot on the bottom left and right of the pack (picture at bottom). You are now ready to attach the pack to the issued ruck.

Lift the Suspension in Your Issued Ruck

Does your ruck hurt your shoulders when you hike? Use the load lifters to pull the weight off your shoulders.

Each ruck strap has stitching and a plastic tension keeper (see picture, right).

Move the keeper as close to the stitching as possible (picture Below, left).

Clip the load lifting clips, and cinch the load lifting strap As close to the tension-keeper as possible (picture below, Right).

Now, when you have 120 pounds of light-weight gear, the pain in your shoulders is transferred to the pack straps and the load will sit on your hips.

Correct Ruck Wear:
Load close to body. Load lifters pulled to tension-keepers.

Plastic Tension Keeper *Stitching*

A Better Dummy Cord

If your NVGs have ever shifted slightly out of place, if your dummy cord has ever interfered with your gear, you need a better dummy cord.

You will need one alligator clip from ALICE gear, two 'S' clips (one very small, one medium), bungee cord (preferably black, white is used here for demonstration), and tape.

Attach alligator clip to the Kevlar by passing it through two vegetation slots on the Kevlar cover. This is now the anchor point. Measure bungee. It should reach from the anchor point to your NVGs when they are down. Cut to length. Tie 'S' clips to each end of the bungee, leave 1-2" tail. Tape down the tail and the knot.

Small 'S' clips will fit in the dummy cord hole on the NVGs. Attach the other 'S' clip to your anchor point. When the NVGs are down, the bungee cord should be tight. The tightness and elasticity of the bungee cord will hold NVGs in place, and stop the annoying shifting that interferes with night-time operations.

Anchor Points. Dummy cord equipment to points that will not move or come loose. Avoid chin straps as anchor points. Avoid 'cat-eyes' and other things that easily tear. A preferred method is alligator clips from the old ALICE gear.

Store Nalgenes and Canteens Upside Down

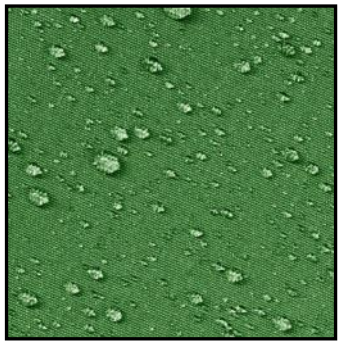
In cold weather, store canteens and Nalgenes upside down.

This prevents the lid from freezing shut and allows you to drink unfrozen water at the bottom

In the event the lid freezes shut, gently tap the lid against a hard object such as an up-armored HMMWV door. After several taps, the lid opens easily.

For cold weather areas, Nalgenes are preferred due to their large mouth. In cold weather, avoid camelbacks, as the hoses freeze quickly.

Gore-Tex Water Proofing



If your DWR is healthy, water looks like this

Wet Out
"Wet out" is when liquid saturates your garment's outer fabric layer above the Gore-Tex membrane, leaving you feeling damp and clammy - as if your garment were leaking, even when it's not.

All Gore-Tex shell fabrics are treated with an ultra-thin treatment called DWR, a durable water repellent polymer that is applied to the outermost fabric layer. DWR penetrates the fibers and lowers the surface tension of the fabric, causing water to bead up and roll off this outer layer of fabric, instead of being absorbed. (picture at right demonstrates healthy Gore-Tex).

DWR is not permanent. Regular wear and tear, plus exposure to dirt, detergents, insect repellent, and other impurities can shorten its lifespan.

To Clean
Machine wash it, rinse it, and put it in the dryer, being sure to follow the manufacturer's instructions on the care label inside. The washing removes dirt and other contaminants and the heat from the dryer helps redistribute the DWR treatment on the fabric surface. Do not use fabric softener or dryer sheets, as they will damage DWR treatment. Generally, dry on low or medium heat for 15 minutes to reactivate the DWR finish.

Test Your DWR
Test your Gore-Tex by sprinkling or spraying some drops of water on its exterior. Does it bead up and roll off? Your DWR is in good shape. If you give the fabric a single strong shake, does most of the moisture fly off? Same.

If, however, the water sits on the fabric and that section begins to darken slightly, water is making its way to the fibers and wetting the fabric. The DWR treatment has reached the end of its useful life and it's time to revive your DWR.

Reapplying DWR
You can restore the garment's water repellency by applying a topical water repellency restorative (DWR treatment) for outdoor fabrics, available at your local outdoor retailer. Wash-in treatments are not recommended; they can hinder the fabric's breathability.

How DWR Works
DWRs work by increasing the "contact angle" or "surface tension" created when water contacts a textile. Basically, a high contact angle creates a microscopically "spiky" surface that suspends water droplets on the outer fringe of the fabric.

An optimized DWR keeps droplets in a rounder shape—like a dome-shaped bead. The rounder the droplet, the easier it rolls off the fabric. A low contact angle permits droplets to assume a flatter shape, one that can spread out like a splotch, cling to the fabric's surface and eventually seep into it.

Attaching Sleeping Bag to the Bivy Sack

Your sleeping bag connects to your bivy sack.

Your bivy sack and sleeping bag have four attachment points:
Head, foot, midway left and right.

The closures on the bivy sack are a button-type snap. Simply loop the Attachment point on the sleeping bag through the snap and fasten shut. (top and bottom picture at right).

Once done, never get twisted up in your bivy sack again.

Stow. Shove attached bivy sack and sleeping bag feet first. The bivy sack Is very well designed and traps air efficiently. To mitigate this, start with The foot so air can escape out of the hood.

Layering the Extreme Cold Weather Bag and Compression Sack

The Extreme Cold Weather Sleeping System is designed to be layered. The brown bag secures inside the improved black bag. Both layered systems are secured inside the bivy sack. The whole thing is rolled into the black compression sack.

Both sleeping bags and the bivy sack have four exterior attachments: one at the foot, one midway on left and right, and one at the head (picture below right; foot attachments not visible).

Lay the brown bag inside the black bag, and secure the hook and look fastener at the foot of the bag. Attach mid way and head Velcro fasteners (picture below, left). At the head, attach the additional toggle (below, middle).

There are two additional toggles on the left and right collar (below, right).

Stow the system:

Fold “hot dog” style. Rolling reduces air most efficiently. Roll the system into the compression sack. Compress air by kneeling on it. Fold top closure in flat. Clip.

Fold compression flap over. Clip and pull tight. Stow in the lower compartment of the ruck. Zip shut.

Completed, Layered System

Notes on Sleeping Systems

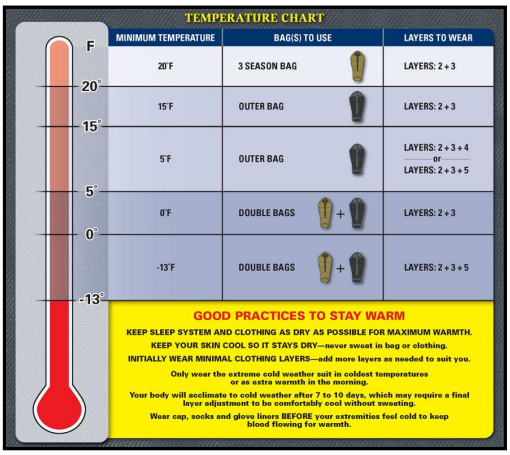
Keep moisture out; it reduces insulation and will not dry.

Be ‘comfortably cool.’ Cool skin stays dry.

Do not breathe inside the sleeping bag, it produces moisture. Unzip the bivy sack vent flap, or unzip bivy sack to allow Moisture to escape.

Fluff sleeping bag after unpacking. Fluff insulation throughout the night. As you sleep, the insulation becomes compressed and looses insulating value.

Insulation traps air. Trapped air keeps you warm.



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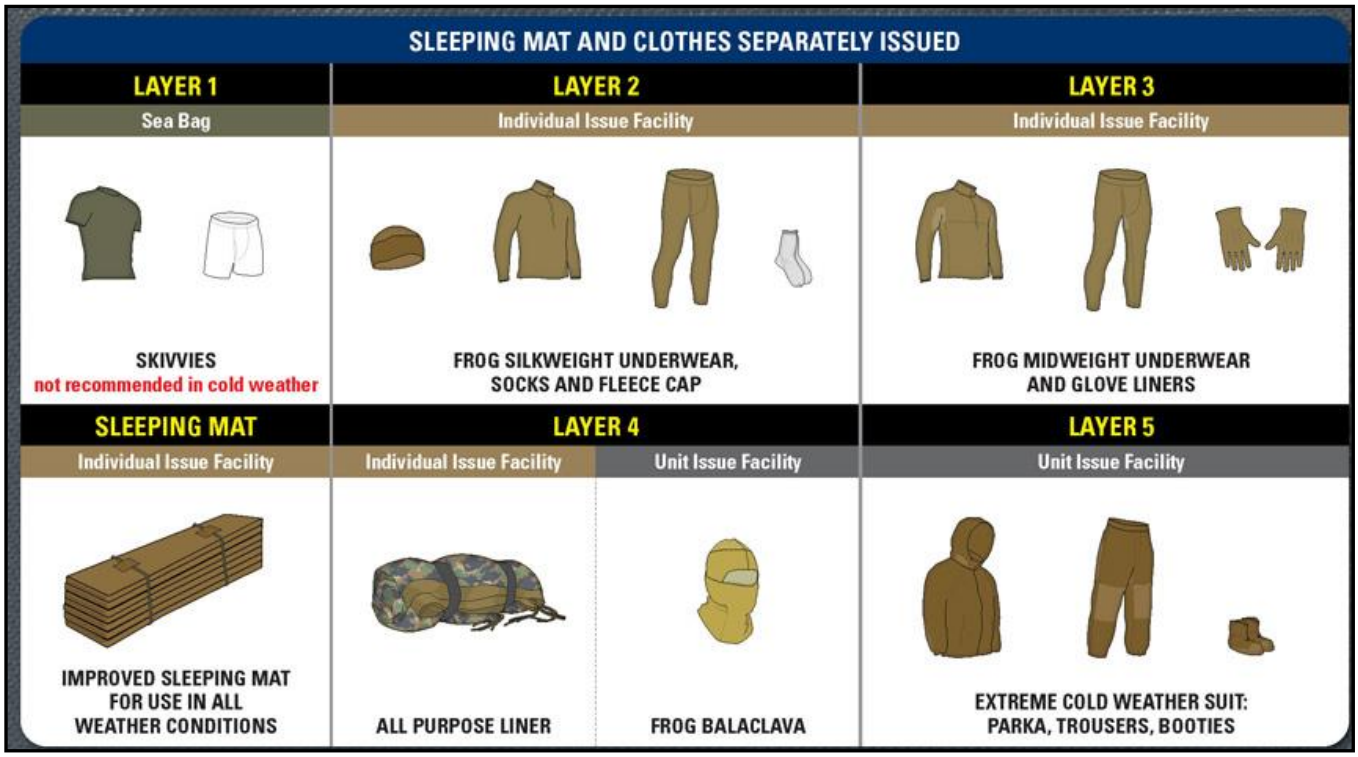
Keep face exposed when sleeping; protect your face with a balaclava.

Sleep in a tactical shelter (as in a snow trench) when able. Shelters add warmth.

Clean your gear: clean gear stays warm and waterproof.

When not in use, store sleeping system in black mesh bag. Do not store sleeping bag in a compression sack.

When sleeping in layered bags, sleep with only the most external zipper closed, for rapidly exiting sleeping bag.



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Notes on Layering: Clothing

Layering Basics
The layer against your skin should be a thin, moisture wicking layer that fits snuggly. Wear an insulating layer (grid fleece, field jacket liner, etc) over this base layer. Over these two layers, wear a wind and water resistant top (gortex). 'Loosely layered' clothing creates pockets of air. These air pockets—warmed by your body heat—keep you warm.

Other Notes on Layering
Do not wear warming layers on patrol, while hiking, or conducting major operations. Marines should begin movements 'comfortably cool' to avoid overheating. During short halts, warming layers should be donned over clothing for temporary warming. Quickly doff warming layers and pack them away before resuming movement.

Do not wear your happy suit under your flak. As an insulating layer, the flak compresses the material in the happy suit, reducing its warming properties.

You can be cold. You can be wet. You can't be cold and wet. Being cold and wet will result in hypothermia—even in temperate climates.

Stop wearing 'skivvy' shirts. Skivvy shirts, especially cotton, absorb and retain moisture, increasing your risk of hypothermia. In hot climates, skivvy shirts retain body heat increasing discomfort and risk of becoming a heat casualty. A standard approach load should include one skivvy shirt, kept in a dry bag, to be worn as the camouflage utility blouse is drying after a hike, patrol or other operation.

Topic

Taping Map Pens Together
Pocket Protractor
Declinate a Protractor
Protect your Protractor
Map Work: Plotting Points
Map Work: Plotting with a Circular Protractor
CAS Map Work Made Easy
Determine Direction from a Reference Point
Magic Eraser
How to Get a Line of Sight Survey with a Map
How to Make Map Overlay Flappies
Notes on Map Work and Land Navigation

Tape Map Pens Together so They're Always Handy

This easy trick ensures your marking and correction pen are always together. You need is two map pens and a roll of electrical tape. Lay the map pens so the working ends are opposite each other and tape tightly together with electrical tape.

Make a Pocket Protractor

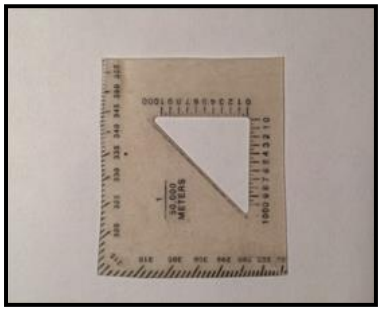
Protractors can be a hassle.

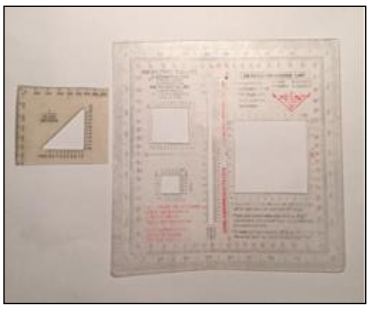
During travel, we typically put protractors in the 'kangaroo pouch' of our flak. Over time, this leads to the protractor becoming bent, scratched, and unusable.

Methods for protecting the protractor include stuffing it into a zipper-closing pouch, usually with notebook, pens, and pencils. The result is usually the same: a bent, scratched, and unusable protractor. Additionally, it is a hassle to access for quick map checks.

Make your own mini-protractor out of a used one. Simply take the used protractor, and with a pair of scissors, cut out the desired scale. In the example, we cut out the 1:50k scale.

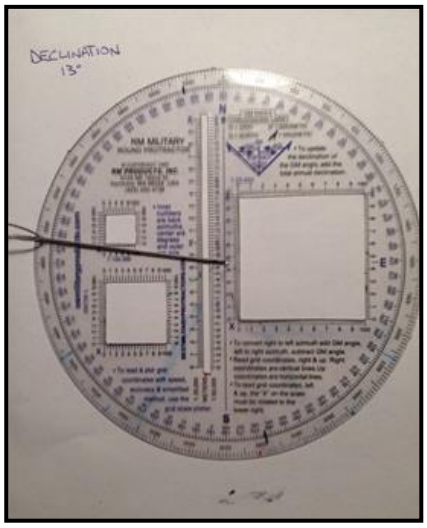
Now, you can abuse your new pocket protractor. Use it for quick map checks while your 'good' protractor stays protected.

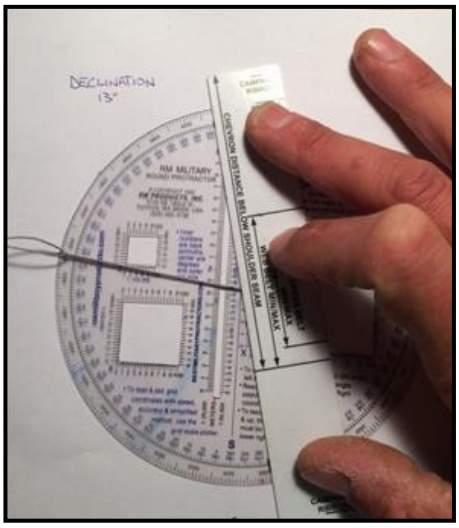


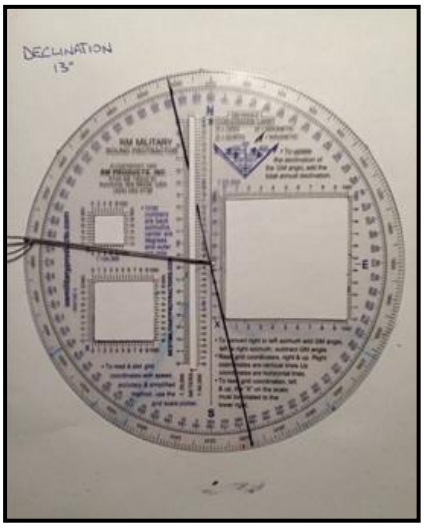


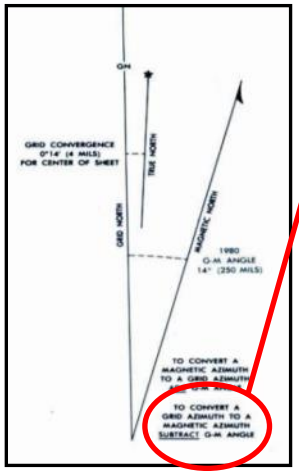
Declinate a Protractor

One of the most common mistakes in map work is forgetting to add or subtract the GM Angle. By 'declinating' your protractor, you never have to worry about that again. Simply find the GM Angle, and do the math (add or subtract, depending on where you are in the world), strike a line through the protractor. Now, to work in magnetic, simply use the new 'declinated' line. To work in grid, use the north to south index line.

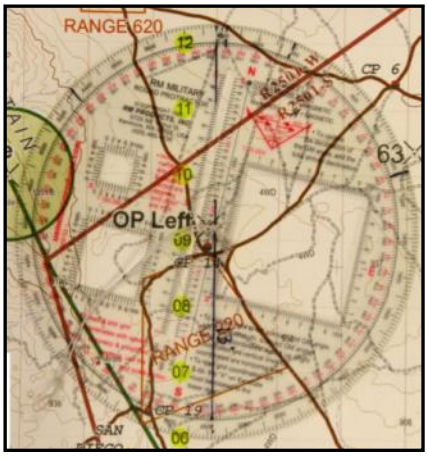








Declination instructions (add or subtract a number) can be found on the declination diagram "to convert a grid azimuth to a magnetic azimuth"

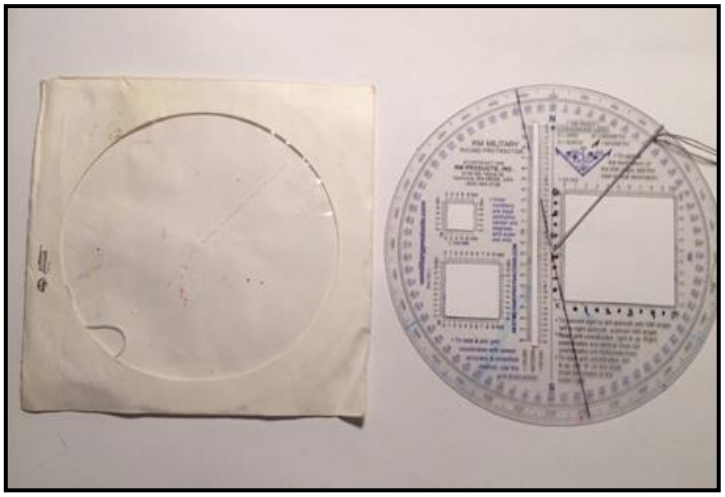


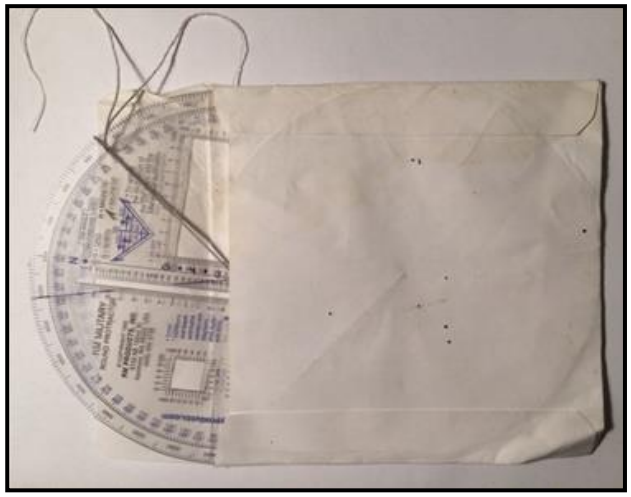
Using a declinated protractor:

Here the user is working magnetic headings using the declinated line.

Protect Your Protractor

Did you know that if you use a round protractor (the preferred method), an empty CD sleeve is a great improvised way to protect your protractor?



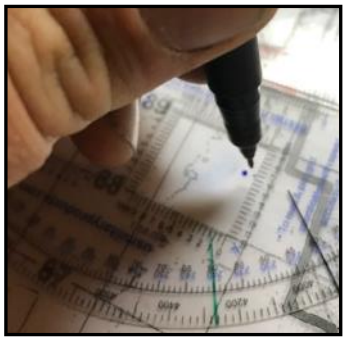


Map Work: Plotting Points

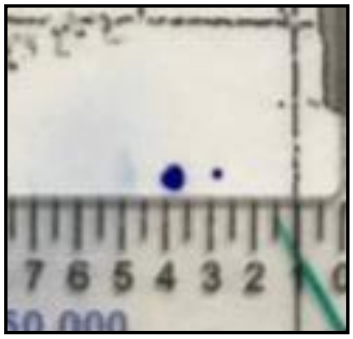
Most land navigation mistakes are made when plotting points. “Superfine” (defined as a 0.5 mm tip) permanent map pens are preferred for map work.

To make accurate plots, line your protractor up on desired grid. Holding the map pen lightly, plot straight down with the map pen. This is the most accurate method. Do not plot with your map pen at an angle, it will usually cause your plot to be off.

Small, fine dots are preferred. Large ‘blob’ like plots can be 50 meters (or more) wide. Pictures below show examples. The plot on the left is blob like, measuring about 50 meters wide. The plot on the right is less than half the size, and assuming it was plotted correctly, is more accurate.



Plot points straight up and down



Poor plots vs good plot

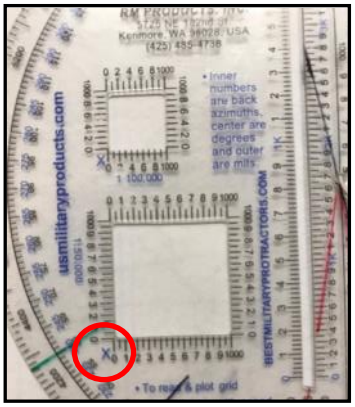
Mapwork: Plotting with a Circular Protractor

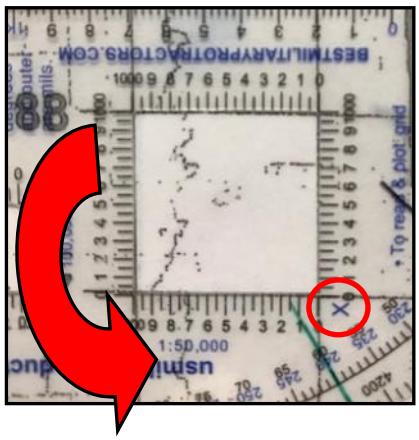
Because of their ease of use with things like close air support, circular protractors are preferred. Because you can erase declination lines without loosing the protractor’s markings, the ‘blue’ circular protractors are preferred over the ‘red’ ones.

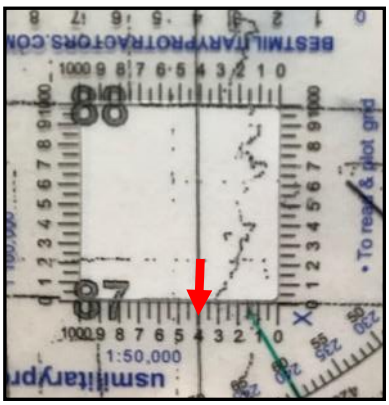
To easily plot points with a circular protractor, locate the ‘X’ in the scale (circled in picture, (below, left). It should be in the lower left-hand corner when the protractor is laid down.

Rotate the protractor one-quarter turn counter-clockwise, so that the ‘X” is in the lower right-hand corner (picture below, middle).

Now, to plot a point, move the protractor left or right until the number you need to plot is on the easting line. For instance, if the easting was 83, the picture below right would depict ‘834.’







CAS Map Work Made Easy

Premark your circular protractor.

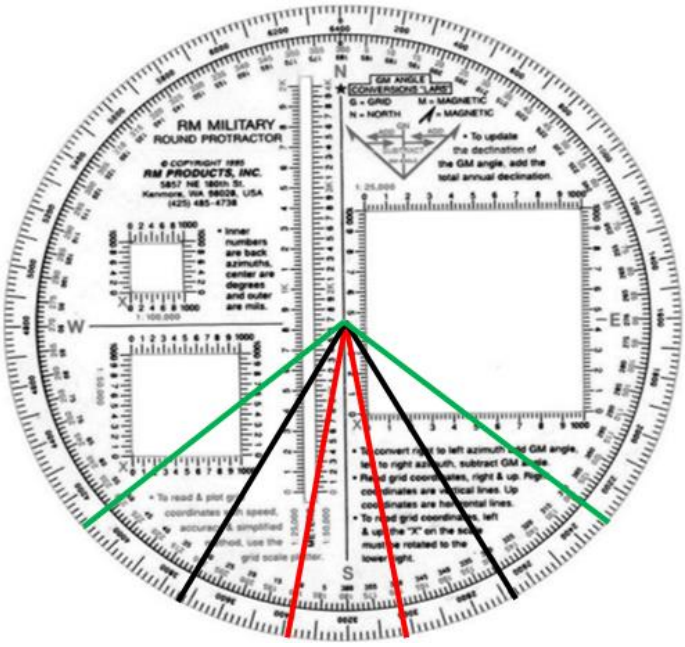
10 degrees left and right of 180. This is your safety basket. Draw in Red.

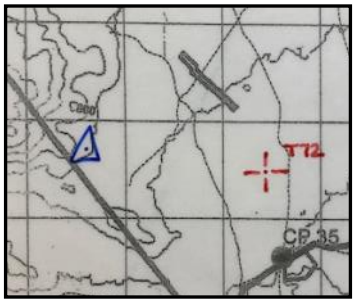
40 degrees left and right of 180. This is your minimum final attack heading for mk-series bombs. Draw in Black.

60 degrees left and right of 180. This is your 'laser basket'. Draw in green.

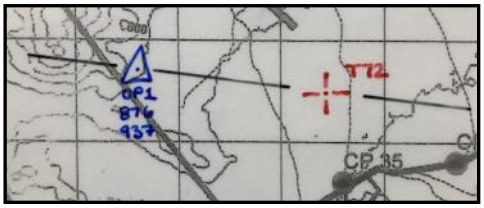
Remember to strike a line through from the center of the protractor to the edge. See example at right.

Using this method, the enemy location is always the center of the protractor and the protractor is oriented so that the observer is always 'south' on the index line. By placing the protractor this way, you can quickly draw safety baskets and final attack headings with less chance of error.

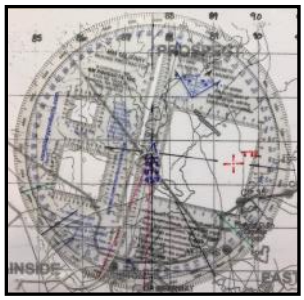




Plot your position and the target location

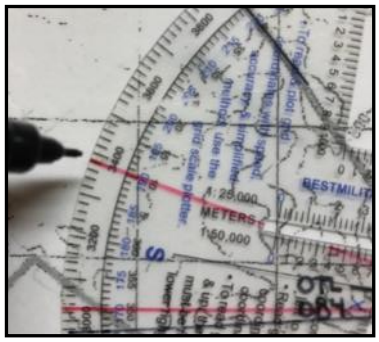


Using a straight edge, strike a 'observer-target' line through the target.

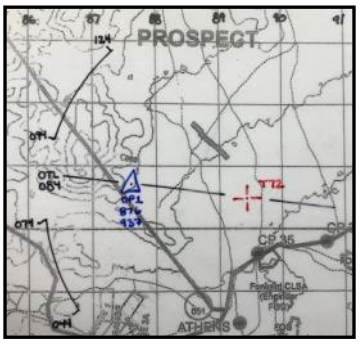


Using the declinated line of your protractor, get a magnetic azimuth.

Placing the center hole on the target, align the friendly position along the S portion of the N-S index line.



Mark from safety line to 40 degree offset line.



Add the appropriate offsets to each final attack heading 'basket.'

Determine Direction From a Reference Point

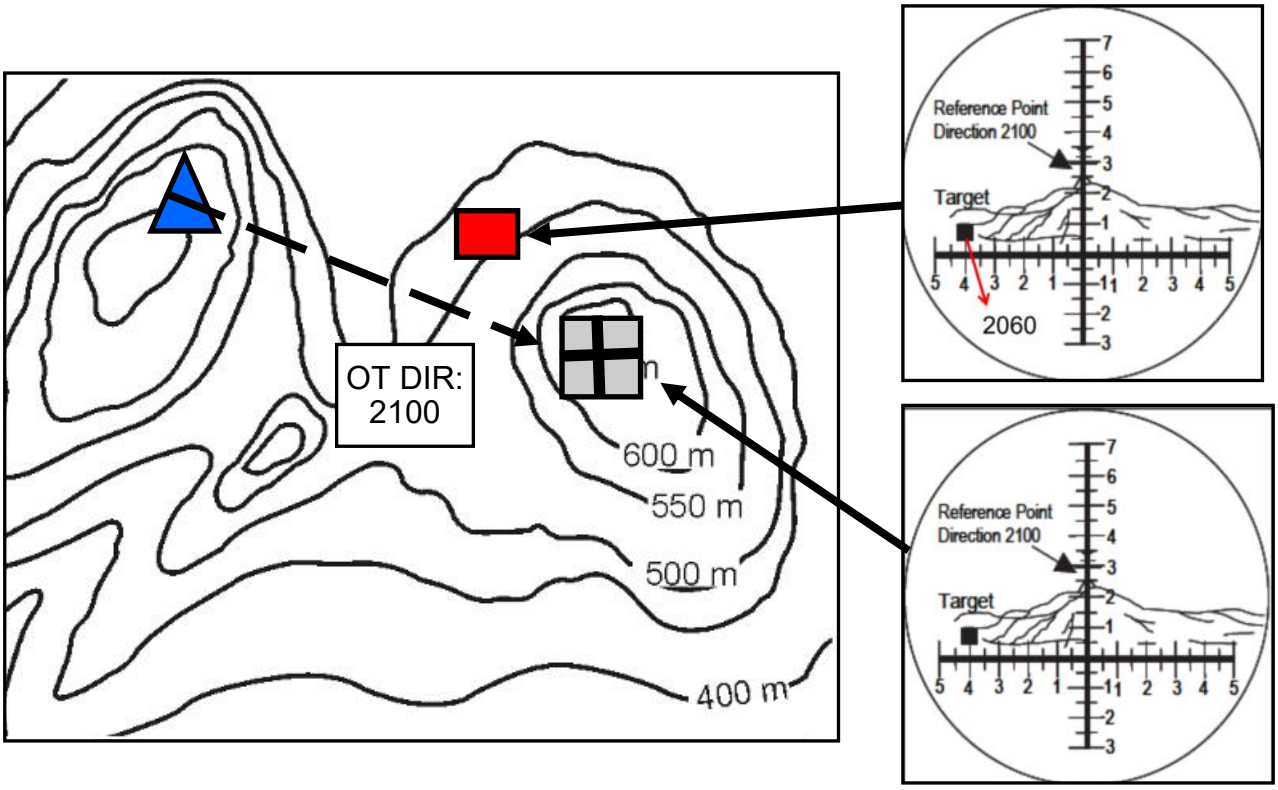
As part of observation post occupation, get a direction to noticeable reference points. Now you can get direction quickly with optics (RCO, Bino).

Establishing target reference points (TRP) occurs early in OP occupation. Note the direction to the target reference point, and its distance.

When an enemy is observed around the TRP, observe them with your optic. Note the deviation in mils from the TRP.

Add or subtract, the mils from the TRP direction. You've now established direction to the target quickly, without a compass, and without a map. Range estimate using the WRM formula.

You are now ready to request indirect fire by the polar method. Account for your OT factor.
See example below.



Magic Eraser

One of the more effective methods for cleaning maps without the mess of correction pens or hand sanitizer is the magic eraser. This household cleaning item works great for sanitizing maps.

Drawback to the magic eraser is that over time, it dulls the map laminate.

Magic Eraser is useful for erasing unnecessary information from protractors and for clearing mortar plotting boards.

How to Get a Line of Sight Survey with a Map

To construct a topographic profile, you need graph paper (with its printed grids, “Rite in the Rain” paper is ideally suited for this), a straight-edge, pencil and map.

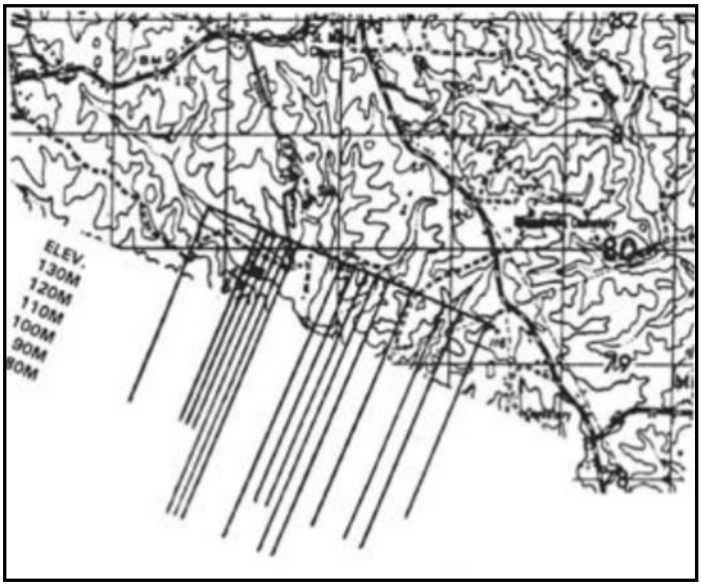
Draw a line across the topographic map through a region of interest to you (e.g., through a hill, A-B line below).

Draw a parallel line the length of this line horizontally near the bottom of the piece of graph paper (this is the x-axis). Then draw perpendicular ‘elevation’ lines on either side of the horizontal line. Add horizontal lines identical to the contour lines. These marks should be the same contour interval.

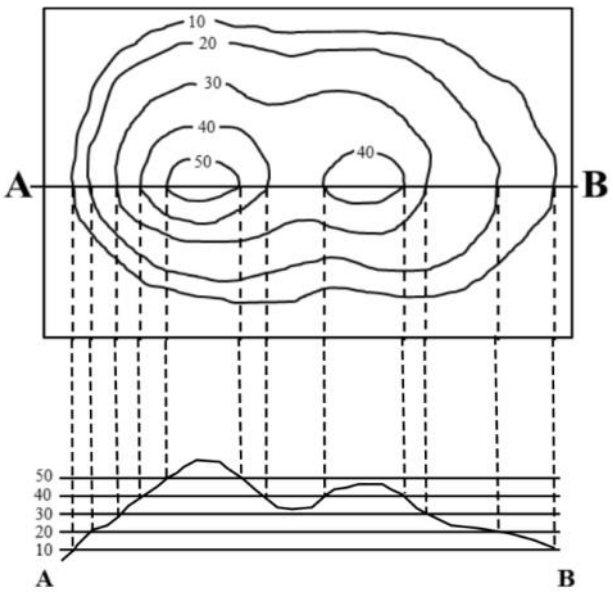
Place the profile on the map, with the x-axis of the profile paper parallel to the line on the topographic map (below, left). Using a ruler, transfer the elevation points from where the contour lines intersect the line on your topographic map straight down onto your graph paper at the corresponding elevation lines as shown (below, left) Plot only elevations that intersect with line A-B.

Once your points are plotted on the topographic profile on your graph paper, connect the dots between each contour point. You should not use straight lines to join the points; smooth lines mimic the topography. You will have to estimate the position of the line between the points on the profile.. As a rule, round hill tops slightly, without crossing the next contour line.

In the example (below, right) the first hill on the left has a top contour line of 50 m. Because there isn’t a 60 m contour line on this hill top, we know that the hill’s highest point (the crest) is some elevation between 50 and 60 m. When connecting the points on your graph paper in the area between the two hills in the picture you again want to round out the area to represent the base of your valley between the hills. Be careful not to make the valley floor too deep, as according to the topographic map the elevation is below 40 m, but not as low as 30 m.



Transferring Elevation Lines
Source: MCWP 3-15.1 Machine Guns and Machine Gun Gunnery



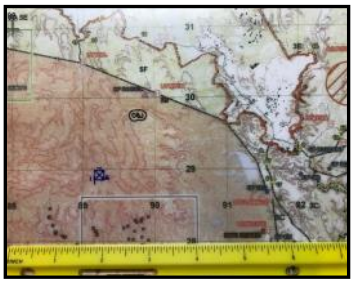
Source: Joyce McBeth (2018) CC BY-SA 4.0, after Karen Tefend (2015) CC BY-SA 3.0

The Overlay: Flappy

If not organized, the operations overlay gets crowded with information. The use of small, independently moving overlays ('flappies') helps organize information. Blocks of information are sorted on their flappy: TCMs on one, fire support plan on one, routes on one, and so on.

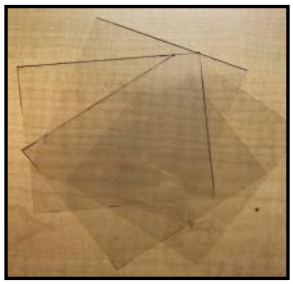
To make flappies:

Lay acetate over map. Plot registration marks.



Determine how big to make flappies. For demonstration, we made them 4.5"x4".

Plot out flappies on a separate piece of acetate.



Cut with scissors.

Place over AO. Draw registration marks. Attach flappy to overlay with a single piece of scotch tape.

Place additional flappies. Copy registration marks to each flappy. Rotate the location of the scotch tape with each flappy, allowing you to lift up a given flappy, and place another down, or to overlay two or more flappies.

All flappies should be able to be overlaid together or independently.

Notes on Map Work and Land Navigation

Check points should never follow sequential order, i.e. CP 1, CP2, CP3, etc. Checkpoints should be random, i.e. CP13, CP19, CP03 etc.

Primary routes should follow even numbered checkpoints; alternate routes should follow odd numbered checkpoints. This way, when calling check points to a COC, you do not need to communicate if you are on your primary or alternate route; they know by the checkpoint number.

Cold Weather Considerations
The liquid in the lensatic compass thickens in cold. The heavy liquid slows the action of the compass and may make it inaccurate. Carry this type of compass near the body in the inner clothing to keep the liquid warm and thin. The dry-type compasses are not affected by cold weather.

Map pens will freeze in the cold. Use a pencil and paper map or a wax pencil as a back up to map pens.

Topic

Demolitions
Improvised Aiming Methods for a Claymore
Improvised Claymore Stand
How to Make a Sliding Tape Knot
How to Make a Det Cord Connector from a Chem Light

Mortars
Protect the Retaining Socket
Rope Hand Hold for Cold Weather Mortar Misfires
Place Aiming Stakes on Frozen Ground
Chain the Base Plate
Loading in Cold Weather
Notes on Mortars in Cold Weather

Rifles
Range Estimation with the Squad Day Optic
Tips on Controlling Your Beaten Zone with an M27
Open the Trigger Guard for Gloves and Mittens

Machine Gun
The Ammunition Purse

Cold Weather Considerations for Direct Fire Weapons

Rockets
How to carry on issued ruck
M136 AT-4 Improvised Night Sight
M136 AT-4 Sights
Notes on Rockets

Improvised Aiming Methods for a Claymore

Poor aiming and siting of claymores are the primary factor in claymores missing their targets.

Improvise claymore sights by taping straight sticks to the front of an improvised claymore (picture, above right).

For both improvised and manufactured claymores, a pen or pencil works well as an aiming device.

Improvised aiming device.

Improvised Claymore Stand

Sometimes time, terrain, and weather do not permit digging in and siting an improvised claymore.

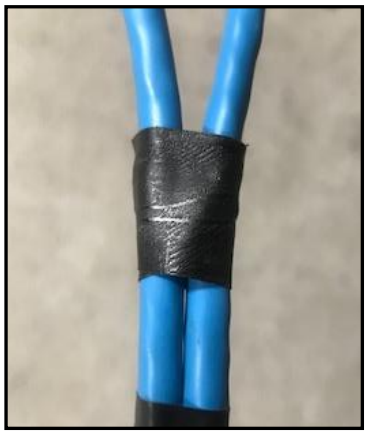
The top lid of an ammo can, attached to the claymore with tape, makes an effective claymore stand. The angle of the ammo can handle is the ideal elevation for aiming at man-sized targets.

Make a Sliding Tape Knot

For our purposes, CAT-V cable will stand in for detonating cord.

Start with a det cord loop. Place two pieces of electrical tape to close the loop and create blasting cap bed.

Place a third piece of electrical tape snugly around the det cord loop, sticky side out. Tape over this to create a sliding tape knot. The sliding tape knot helps quickly secure det cord to your target (picture, below right)

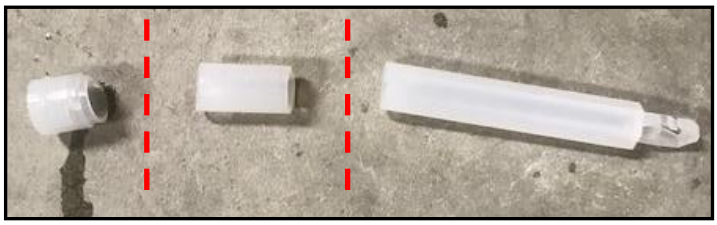
Make a Det Cord Connector from a Chem Light

Hold pieces of det cord tightly and quickly attach to each other by making a det cord connector.

Using an expended chemlight, cut a section approximately 1.5”.

On one side, cut two “V” shapes on each side.

Slide on to det cord loop priming system. Attach by rotating the “V’s” until it bites onto the connecting det cord.






Protect the Retaining Socket

During periods of rain, or during firing, dirt and debris can build up in the retaining socket (picture, below left).

In cold weather environments, water, ice, snow, and dirt can freeze in the socket and hamper the functioning of the cannon.

To prevent this, tie a sandbag, plastic sheet, MRE sleeves (taped together) to the base of the cannon. Do not prevent the functions of the cannon (picture, below right).

By protecting the socket, the cannon and baseplate can still function during inclement weather.

Rope Hand Hold for Cold Weather Mortar Misfires

To better handle mortar misfires use a rope hand hold. On one end, tie a large loop. On the other end, a smaller loop. Tie the rope to the cannon around the breach cap with a slip knot (picture below).

During operation in cold weather, mortar cannons can become dangerously icy and slippery. To prevent accidently dropping the cannon, use the rope to lift the cannon (picture below, right). Hold the rope by the fingers. Do not wrap it around the wrist.

See TM 4-33.31 *Cold Weather Maintenance Operations*, Chapter 7.

Place Aiming Stakes on Frozen Ground

Mortar firing crews may find it near-impossible to set aiming stakes into frozen ground. Additionally, snow doesn't always make the best material to set aiming stakes. An alternate method is to use a dirt-filled object (cans, MRE boxes, sandbags) to set in aiming stakes on frozen ground.

The pictures below show a #10 can scavenged from the chow hall.

Chain the Base Plate

MCRP 3-35.1D *Cold Region Operations* states: "After emplacement, Soldiers and Marines may find the base plates hard to remove."

In cold weather environments, and after firing, the baseplate may freeze—especially if it has been in place for several days (picture, below left). To make the baseplate easier to pull up, attach a chain or rope (chain pictured below right) to the base plate prior to sinking it. When it is time to move positions, yank the baseplate up with the chain after the gun is broken down.

Loading in Cold Weather

In cold temperatures, anti-contact gloves must be worn when prepping or loading ammunition.

Gloves can not be bulky or loose fitting, and should be secured by a wrist strap. The gloves must allow for dexterity. Issued Outdoor Research brown intermediate cold weather gloves work reasonably well, but don't have ideal grip. CIF issued wool insert gloves work as well (below, right). They have a rubberized palm and finger grip, but users must ensure they fit snugly.

Loose gloves can get sucked into the cannon by the vacuum that occurs when a round is dropped, or can get pinched between the round and the blast attenuator device.

Gloves should not be removed when temperatures fall below +20 degrees Fahrenheit.

Notes on Mortars in the Cold Weather

Program the mortar ballistic computer to accept temperatures down to -50 °F (-46 °C). This automatically compensates for cold-induced slow burning of charges when computing firing data. The mortar ballistic computer is not programmed for temperature inputs colder than -50 °F (-46 °C).

Breathing on sights or on the mortar ballistic computer will fog and freeze equipment.

Mortar malfunctions occur in direct proportion to the severity of the weather. After each mission, Soldiers and Marines swab bores thoroughly to remove any excess propellants.

Personnel avoid using point detonating (PD) fuses due to the severe dampening effects of snow. Airbursts are preferred. As temperatures fall, the rubber tube cover may harden and become extremely difficult to remove.

When firing in drop-mode, expect a greater number of misfires. Using the trigger-mode will correct this in some instances.

Marines cover muzzles and sights when not firing the weapon to prevent snow and ice from entering the tube.

Personnel need to check mortar technical manuals for appropriate misfire procedures.

Notes on Mortars in the Cold Weather Continued

If your aiming stakes are set in snow, use a compensated sight picture as the rule, and not the exception. Aiming stakes set in snow tend to lean and become loose, especially as snow begins to melt during the day. If able, set in aiming stakes with a can, sandbag or MRE box.

Because frozen ground doesn't absorb shock well, the cracking, bending and breaking of baseplates is one of the greatest hazards during cold weather firing. Baseplates must be dug into the ground. After digging, a small bed of organic material (e.g. leaves) to absorb shock. If able, layer sandbags on top of this bed. The bed of organic material should not be so thick as to cause the baseplate to "bounce" and should not be thick enough to prevent a good sink.

If mortars must be placed on frozen ground, select a site that has natural vegetation.

To prevent freezing to the ground, coat the bottom of the baseplate with a light coat of waste oil.

Use two Marines on the bipod when seating on ice or at high elevation (1,300 mils or higher)

The baseplate is best seated by firing at a quadrant elevation of 1,200 mils and a middle charge

Avoid using maximum or near maximum charges if the mortar baseplates is seated on a frozen surface. Even when the baseplate appears to be properly seated, when firing at elevations below 900 mils, the crew can expect the mortar to shift to the rear, and even collapse.

When firing at low temperatures, double misfire wait times due to the possibility of delayed ignition.

In cold, the metal for mortar tubes becomes increasingly brittle. This brittle condition increases the rate of micro-fracturing as the tube is fired. Mortar units should have their tubes inspected prior to cold weather live fire operations to affirm that the tubes will remain safe during the duration of the operation. Tell the weapons inspectors that the weapon will be working in severe cold.

Due to the tremendous shock and off center weight of the sight, sight-mounts are prone to breaking if the baseplate is not solidly positioned. Remove the sight each time before firing until the baseplate is settled.

Use LAW instead of General Purpose Lubricant (GPL) below +10°F (-12°C) as a lubricant and bore cleaner on the newer 60 mm, 81 mm, and 120 mm mortars. The bore should be kept dry, and lubricant kept away from the firing pin. All moving parts and the bore should be checked for snow and ice before firing. Otherwise, use a heavy cloth muzzle bag to keep snow out of the bore. Never lubricate mortar shock absorbers. NOTE: CLP is not to be used in the bore of a mortar.

The following guidelines usually apply to ammunition in a winter environment:
Ammunition and cannons should be about the same temperature. Due to incomplete burning of propellants, expect a decrease in achieved range versus the plotted range. This decrease may be as much as 10% at -10°F (-23°C) and 20% at -40°F (-40°C).

Keep ammunition and tube dry. Only open as many rounds as required for the current fire mission and then afterword use the tube cover provided.

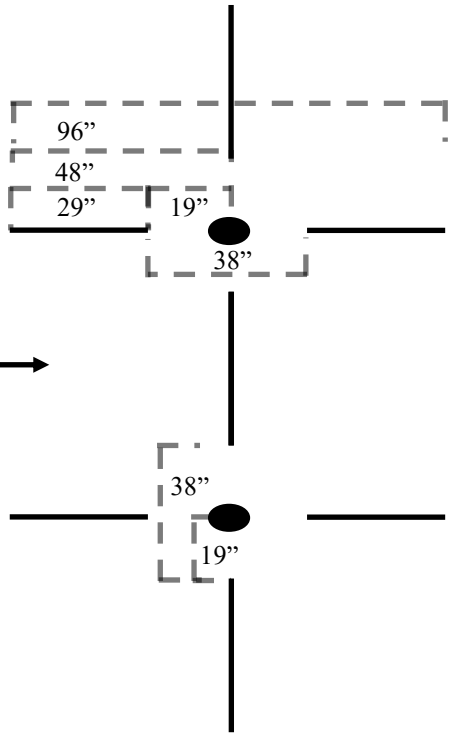
Due to incomplete burning of propellants, dry swab the tube after every tenth round or after every fire-for-effect. Swab bores thoroughly after each mission to remove any excess propellants or condensation. Boresight frequently.

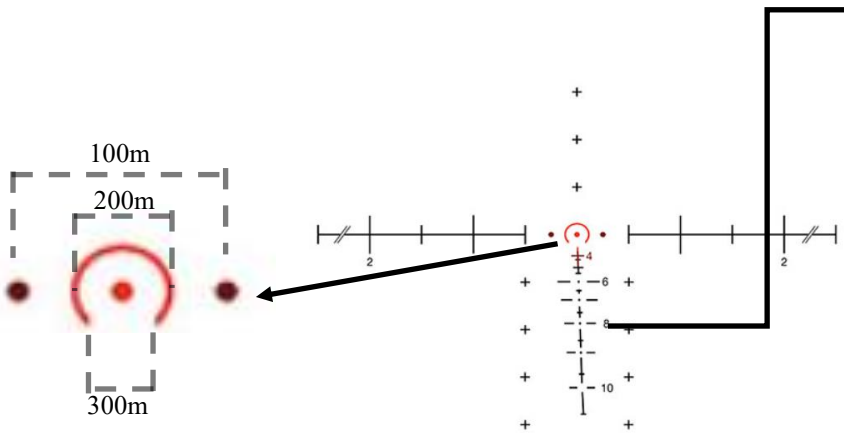
Range Estimation with the Squad Day Optic

The Squad Day Optic has many unique ranging capabilities build into its design. Horizontal stadia lines depict widths from 19”-96” for ranging common objects. See picture, right, for widths.

Ranging 19” objects from 100-300m is done with the horseshoe reticle displayed in the picture below, right.

The horizontal stadia lines are 35 mils wide on each side from the red dot.





Tips on Controlling Your Beaten Zone with an M27

0311 riflemen are not adequately trained on controlling their beaten zone as automatic riflemen. To control the beaten zone:

Feet should be naturally placed, as if standing.

Dig toes into the ground. Push hard out of the toes.

Body should be in-line with the toes. The weapon should extend in a generally straight line. This allows for efficient shoulder pressure from pushing out of the toes (indicated by yellow line, picture right).

The sling should be tight. Fore hand should be ‘chopped’ inside the sling for additional stability.

Pressure starts from the toes, and is transferred to the shoulders, to the weapon, and to the bipod stop. This is very similar to shoulder pressure taught to machine gunners.

Open the Trigger Guard for Gloves and Mittens

The trigger guard on the service rifle is held in place by a retaining pin (picture, left).

To fire the weapon while wearing bulky gloves or mittens, press the retaining pin, and allow the trigger guard to swing down to the pistol grip.

Push the retaining pin back in.

Machine Gun Ammo Satchel

Among the many burdens that machine gunners bear, ammunition is probably the greatest of them all. Carry more ammo more comfortably by fashioning an “ammunition purse”.

Open the ammo can and remove the cardboard tops from the 100-round sections. Link the two sections together (not pictured) to create a 200-round belt. Leave the shoulder loop from one of the bandoleers hanging outside of the ammo can. Now close the lid, and sling as many ammo cans as you are able to carry.

Cold Weather Considerations for Direct Fire Weapons

Lubricants. Traditional lubricants such as CLP thicken in cold regions. This thickening causes stoppages and sluggish operation of the weapon. CLP will freeze at -35 °F (-37 °C). Before changing lubricant types (for instance, going from CLP to LAW), Marines must strip the weapon of CLP, clean it, dry it and lubricate it with lubricating oil arctic, weapons (LAW). Should Marines be unable to completely strip and clean their weapon, they lightly oil the camming surfaces of the bolt with LAW. The rest of the weapon remains dry. LAW is available in one-quart containers but not in the refillable half-ounce bottles normally found in weapons cleaning kits. If LAW is not available, use a dry graphite lubricant. As a last resort, fire the weapon dry.

Condensation. Weapons are considered 'cold-soaked' when their metal and plastic are around the same temperature of the ambient air. Taking a cold-soaked weapon to a warm environment causes the rifle to form condensation—a process known as sweating. To prevent condensation, keep cold-soaked rifles cold. Place them in the vestibule of a tent, or similar location. If weapons are kept inside, they are kept on or near the floor to minimize condensation.

In the event that weapons are taken from a cold to warm environment, frequently dry all components with a rag. Weapons will sweat for approximately an hour after being taken into a warm environment. Condensation rusts the weapon, and freezes to ice when taken back outside. Both rust and ice cause stoppages in the weapons.

Snow and Ice. Marines request shoot-through muzzle covers for weapons to keep the weapons clear of snow and ice. If none are available, individuals improvise. They can use plastic bags, tape, or condoms. Marines close ejection port covers. Personnel should carry something to de-ice a weapon if part of the weapon becomes frozen. Windshield wiper fluid carried in a small bottle works as does aircraft de-icer and antifreeze. Periodic cycling of the weapon will also keep parts from freezing. Marines operate the action on weapons periodically. This can help identify icing issues. Specifically, Marines action a weapon for two hours after taking it from warm to cold to prevent condensation from freezing.

Visibility. Marines can encounter a visibility problem when they fire weapons in still air conditions with temperatures below -30 °F (-34 °C). As the round leaves the weapon, the hot propellant gases cause the water vapor in the air to condense. These droplets of condensed water vapor then freeze, creating ice particles that produce a cloud of ice fog. This fog will hang over the weapon and follow the path of the projectile, obstructing the gunner's vision along the line of fire as well as revealing the gunner's location to the enemy. When faced with this problem, fire at a slower rate and/or relocate to an alternate firing position. Tests have shown that even in warmer temperatures, a fog develops around the gun. Hot gases from the gun and the breath of the gunner create the fog, making it difficult for the gunner to observe the strike of rounds. For crew-served weapons, the assistant gunner may need to take up a position further left or right to help with adjustments. For individual weapons, Marines may need to change position frequently.

Optics. When using optics in the cold, gunners must avoid breathing on the sight. Breathing on the sight causes condensation. Since the warmth put out by the proximity of the face can cloud the sight, individuals allow a space between the eye and the sight. When taken from a cold to a warm environment, individuals allow the optics to adjust to the new temperature slowly to avoid cracking the lens.

Carrying a Rocket

Rockets have an arming distance, usually around 10-17 meters. Due to this, when carrying rockets of any model (M136, M72, Mk-153 SMAW rockets), they are carried 'nose-down' regardless of if they are slung on the body, or strapped to a ruck.

In the event of a discharge, the rocket warhead will bury itself in the ground before it arms. The backblast will be directed up and away from personnel.

M136 AT-4 strapped for carriage

M72 strapped for carriage

Improvised Night Sight

Although newer models of the M136 AT-4 are designed with a rail system for night aiming devices, older versions are not. The result of this is the M136 can not be fired at night, unless battlefield illumination is coordinated.

The field expedient method of night firing the M136 is to activate a chem light. Cut open the top. Using your finger or a rag, 'paint' the front sight post and rear sight aperture with the chem light liquid. This allows for achieving a sight picture at night. Chem light juice will last 30 min—1 hour.

This method requires a point of aim. Point of aim is achieved by pairing tracers from a machine gun or a unit leader's weapon. The rocket gunner aims on the tracer's impacts. While primitive, it works when night aiming equipment is unavailable.

M136 AT-4 Sights

Some M136s have a new design rear sight. To transition from the day/narrow sight aperture to the wide/night aperture do the following:

Grab each side of the narrow aperture. Pull slightly 'back' (toward the rear of the launcher). Rotate 180°.

To replace the day/narrow aperture, rotate 180° until the narrow aperture locks into the wide "peep" sight.

As designed, the narrow sight sits inside of the wide/night sight. Do NOT force the sight to swivel without pulling it away from the wide/night sight first.




Notes on Rockets

Cold Weather. The M136 (AT-4) antitank weapon has plastic and rubber components that become brittle and can crack in extreme cold. When firing the weapon, ice fog and vapor trails occur. Sights are more difficult to release from their covers in cold temperatures. To prevent the icing of sights, the gunner wears a facemask or scarf when temperatures reach -15 °F (-26 °C).

Helicopters. Currently, the only model of rocket that discharges by electrical input are rockets fired from the Mk-153 SMAW. Due to this, when carried aboard an aircraft, SMAW rockets should be temporarily stored in a foil bag to prevent discharge from static electricity. A field expedient foil bag can be made from the shipping foil common to ammunition packaging. Rockets are unpacked, inspected and prepped, then repacked in a foil bag and sealed with tape. Other models of rockets (M136, M72) operate with a mechanical firing mechanism, and don't require this type of packaging.

Topic

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Tie-Ties
How to Make Jute
Conditioning

Camouflage Your Boonie

Camouflage Your Ruck
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Camouflage Your Gear
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Camouflage Your Position
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Observation Post: Forested Area
Observation Post: Desert Area Method 1
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Camouflage Vehicle

Notes on Camouflage

Camouflage Basics: Tie-Ties

The art of camouflaging involves a few specific skills and a lot of preparation. Tie-ties are usually step one. Tie-ties allow the individual to tie local vegetation. Ideally, tie-ties are made in advance from 550-cord. Boot bands work well too, but overall are expensive. It is best to make a lot of tie-ties in one sitting.

To make tie-ties, cut a long length of 550-cord. Remove the innards, and save innards for your terrain model kit. On a table, tape a 'god-length' piece of tape, roughly 12" long. The 'god-length' piece is the measured piece for all subsequent pieces. Cut 12" pieces of 550-cord.

Singe the ends of each 12" length. When working in bulk, a candle is the preferred method for this.

Tie-ties are typically attached to fish net, MOLLE webbing, or your substrate using a clove hitch.

Use a bow-tie when tying vegetation into tie-ties. It is easier to strip the vegetation out when you are done, and keeps tie-ties untangled.



Camouflage Basics: How to Make Jute

Jute is harvested from burlap sandbags or local arts and crafts stores. Jute is a natural fiber that is used to break up unnatural shapes of gear. Jute is incredibly efficient camouflage material, and should be (in conjunction with your substrate of fishing net) the basis for using local vegetation.

To make jute, cut the bottom and side off a burlap sandbag. Lay flat (picture top right)

For a chunkier, 'leaf-like' base, or for tactical vehicles, cut burlap into 1" strips (no guideline here, nothing in nature is perfect). Larger strips are ideal for tying onto camouflage netting for vehicles. Picture at middle right is burlap strip tied on to a helmet

Gently pull single strands of jute out of the weaving. Ideally, jute strands will be 8-14" long.

Bundle 6-8 strands of jute together, and tie them into your fishing net using a clove hitch (picture bottom right). For larger areas, jute should be tied roughly 6" apart.

Camouflage Basics: Conditioning

Conditioning jute and other materials is an important, deliberate and time consuming process. Conditioning rids materials of shine and breaks them in. Condition materials well ahead of planned exercises and operations.

Make mud. If you do not have an outdoor area available, dirt and water mixed in a plastic tub works well. Soak material. After soaking, stomp, rub and abrade material. Add more water as needed. This can take from several hours to several days.

Hang materials to dry. Sun light dries mud, and helps fade colors. Hang to dry and fade for several days. Let the weather be the weather: if it rains all the better.

On a rough surface (pavement, or rocks) abrade material by stomping or rubbing. Abrading with a steel brush works well too. The goal is to break up 'dread locks' of mud and jute. Abrading removes shine. This will take several hours for each piece.





Camouflage Your Boonie

The standard-issue boonie has a band sewn into it to accept vegetation. A more effective method is to tie tie-ties onto this band. Tie-in fist-sized clumps of local vegetation.

"...the Viet Cong welcome all the obvious lapses in camouflage discipline."

-Knowledge Gained From Operational Experience in Vietnam, 1967, FMFRP 12-41 U.S. Marine Corps

Camouflage Your Ruck: Tie-ties

There are two main methods for camouflaging your ruck: hasty and deliberate.

Deliberate camouflage includes constructing a layer to weave tie-ties and jute into.

This method uses the MOLLE webbing on the top lid of the ruck. Vegetation is then tied into the tie-ties.

Camouflage Your Ruck: Camouflage Netting

This deliberate method uses a section of camouflage netting attached to your ruck. When not in use, the netting can be rolled up and stowed with the ISO mat or stowed on the top lid of your ruck.

Camouflage netting can be painted to blend in to the local environment. Tie-ties and jute can be tied on to the camouflage netting.

When painting camouflage netting, use spray paint designed for use on cloth.

Camouflage Your Ruck: Ghillie Blanket

This method requires extensive preparation. A 5'x7' blanket was made by sewing fishing net to a mesh substrate with a draw-string. This blanket included webbing to stake the blanket down over a fighting position, and clips that allowed multiple blankets to be put together.

Jute and tie-ties were tied in to the blanket. The blanket was extensively conditioned.

The blanket pictured below was designed by SSgt Rick Mikesell. It was designed to camouflage the ruck, and with the help of a buddy's blanket, cover a fighting position.

Camouflage Your Ruck: Hasty Method

Keeping two bungee cords on your gear allows you to quickly camouflage your ruck. Simply attach a bungee cord toward the top and bottom of your ruck. Insert large vegetation through both bungees, shorter vegetation through one. 'Veg up' three sides of your ruck, leaving the frame and harness slick.

In the event you do not have bungee cords, insert vegetation through compression straps and MOLLE webbing. This method does is not as effective due to limited 'real estate' for vegetation.

Camouflage Your Subbelt

Attach boot bands, bungee cords, tie-ties or like items to your sub-belt to camouflage it.

Camouflage Your Helmet

There are two main methods for camouflaging your helmet: hasty and deliberate.

The main objective with camouflaging your helmet is to disrupt the distinct shape and outline of the helmet.

Hasty methods include using vegetation slots and cat eyes. Deliberate methods include using fishnet, laundry bags, engineer tape, or veils.

Disrupt the shape and outline of the helmet

Camouflage Your Helmet: Vegetation Slots

The slots on the helmet cover are designed to hold pieces of vegetation.

For helmet covers that are tight, use a thicker piece of vegetation to act as a guide (picture, right).

Repeat until desired effect is achieved.

Insert vegetation with a guide

Camouflage Your Helmet: Cat Eyes

Camouflage your helmet quickly by taking fistfuls of vegetation and inserting it into your helmet (picture, below middle) until the desired effect is achieved (picture, below right).

Camouflage Your Helmet: Netting, Jute, and Tie-Ties

Prepare the helmet by sewing, gluing or taping fishing net to the helmet cover (pictures below, top row). Other substates that work include boot bands and a veil (purchased from the local Marine Corps Exchange, picture below, bottom row).

Tie jute and tie-ties into the substrate. Condition the helmet cover to decrease shine.






Camouflage Your Helmet: Snow

Camouflage your helmet in a manner similar to jute.

Using white materials (engineer tape-also known as 'e-tape' works well). After being woven into the substrate, fray the material until it looks similar to the picture at right.

Other material that work well are bedsheets cut into 1"x8" strips. Condition the material with snow in a similar manner to conditioning jute. Snow abrades the materials, and decreases shine.

This method was pioneered by Corporal Downey and Lance Corporal Sivertsen of Company B, 3D LAR.


E-tape as camouflage. The picture at left shows a Marine with a distinct outline and shape of his helmet . The picture at right is the same Marine with a "snow-ghillied" helmet. When camouflaged, this Marine was unnoticeable at 25 meters.

Snow-conditioning the helmet.

Camouflage Your Gear: ‘Ghillie Blanket’

Camouflaging gear is best done by making a ‘ghillie blanket’ ahead of time. This method uses a laundry bag as its base material, and requires quite a bit of preparation.

Cut the laundry bag open, and spray paint it a light-brown color. Tie in jute and tie-ties as required and explained in the beginning of the chapter. Condition the ghillie blanket.

Using 550-cord, or like item, create attachment points in order to either wear the ghillie blanket in a cape –like fashion or tie it directly onto the flak jacket. The ghillie blanket should sit in such a way as to disrupt the natural human shape created by the shoulders (picture below, right).

Camouflage Your Weapon: Snow

Black rifles are very noticeable in a white, snowy environment (picture, right). Hastily camouflage your rifle with e-tape. Attach (tie or tape) the e-tape to your rifle. Wrap it around handguards, optics and the buttstock while taking care to not impede the functioning of the rifle.

The picture (below, left) shows how even a basic e-tape wrap can significantly disrupt the shape and outline of the rifle. Fraying the e-tape provides even more camouflage (picture below, middle).

Picture (below, right) shows a British soldier with a snow-camouflaged rifle, 1940.

Camouflage Your Weapon: Boot Bands

Another simple method for camouflaging your rifle is to use boot bands, rubber bands and local vegetation. Simply wrap boot bands around the handguards, buttstock, and optics and place fist-sized clumps of local vegetation.

If more time is available, the rifle is prepared with a burlap base layer. Large areas can be covered in tape.

Camouflage Your Optics

Optics—especially when on an observation post—are camouflaged with the same diligence as personal gear and rifles.

Boot bands, rubber bands, and burlap form a great base to stuff vegetation into. Marines from K/3/7 pioneered this method.

Camouflage Your Position

A fighting position constructed during Third Battalion, First Marines' Tactical Small Unit Leaders Course. Photo courtesy Captain Austin Johnson, 2016

Firing Ports
Be cautious of the area immediately in front of the fighting positions' sandbags. Loose or fine powdered dirt creates smoke and debris when the rifle is fired. Not only does this obscure your view, but it gives away your position. Water down the area to lessen the effects of dirt.

Vegetation Clumps
When camouflaging a fighting position it is a best practice to replicate surrounding terrain. The parapet of a fighting position must be camouflaged. The problem is that simply throwing cut vegetation on the Parapet is not effective; it is not '3 dimensional.

Dig 'clumps' of vegetation—roots and all—and 'plant' them on your fighting position. By digging up the roots and planting, you increase the life expectancy of the vegetation.

Mayan Terrace
The Mayan culture cultivated crops on steep terrain. They did this by building terraces of the sides of hills. Use sticks to create miniature terraces. Plant vegetation clumps on these terraces.

Overhead Concealment.
Issued tarps do not work for overhead concealment. Tarps are very shiny and can be seen by UAVs from a considerable distance away.

Dirt Discipline
When digging fighting positions, do not throw the dirt out of the fighting position recklessly. Especially in grassy areas, avoid excessively trampling vegetation as you walk around your fighting position. Both dirt and trampled vegetation are easily seen from UAVs (picture, right).

DJI Phantom, 500 ft AGL

Camouflage Your Fighting Position: Subdue Synthetic Sandbags with Mud

Synthetic sandbags are shiny. Their shine can be detected by UAVs flying nearly 900' above ground level and more than 500 meters away.

Make synthetic sandbags unnoticeable by mixing up some mud. Smear the mud liberally on the sandbags.

This simple trick reduces UAVs ability to detect the shine of sandbags to a level similar to burlap sandbags.

4

The difference a little mud makes. Sandbags were smeared with mud (picture, left) were unable to be detected by a UAV at 100 ft.

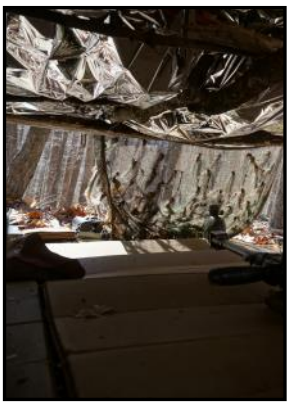
Sand bags not smeared with mud (picture, right) were able to be detected by a UAV at 867' AGL and over 500 meters away.

Camouflage Your Observation Post: Forested Area

LP/OP established in support of a platoon defense. OP is manned by 2-4 Marines. Corners are propped up by tripod-lashed deadfall branches assembled before departing and carried on a ruck. Cross beams laid between the tripods form the basis for a "roof" that was layered with a cheap mylar blanket, tarp, and foliage.

This site went undetected by multiple patrols that passed within 30 meters or less. Site was undetected by thermal optics (UAS and man-packed). A thermal optic-equipped night patrol specifically tasked and given a grid could not locate it until the Marines inside were told to come out and stand up.

Inside view, picture below, right.



Camouflage Your Observation Post: Desert Area Method 1

This desert OP was made by layering cheap mylar blankets under standard cammie netting. Poles kept the cammie netting 18-24” off of the ground.

Prepare cammie netting with jute strips and tie-ties for local vegetation.

The observer window was created from off-the-shelf plexi-glass. Currently, thermal optics cannot see through glass or plexi-glass.

Camouflage Your Observation Post Desert Area Method 2

An alternate method of OP concealment relies on some common objects, such as spray adhesive, a bedsheet and chicken wire.

Glue, tie or spray-adhesive chicken wire to canvas, bedsheet or similar material.

Using spray paint, paint bedsheet to match terrain.

Employ by molding the chicken wire to resemble surrounding rocks or foliage.
If you want, you can tie in 1” strips of jute and tie-ties to compliment this method.
Extra tie-ties are added at the corners to stake down the sheet..

In the pictures below, an average white bedsheet was turned into OP concealment

Camouflage Your Vehicle

While camouflaging a tactical vehicle shares common ground with other principles of camouflage, they have a few special considerations.

Tire tracks. Tire tracks can be seen from UAVs, day and night. Soil that has been traveled has a different thermal signature than the surrounding terrain, making it easy to see with thermal optics. While tire tracks are unavoidable, traveling within the lead vehicle's tracks is ideal to lower the signature of multiple vehicles. See picture, right.

4

Heat Scarring. Heat scarring is the latent heat generated from a running vehicle. For a time after the vehicle departs, the heat signature lingers. This, in conjunction with tire tracks, allow positions to be identified or track by enemy observers.

Shine. There are many parts on tactical vehicles that shine, or reflect light. Glass and headlights should be considered when selecting positions. Their camouflage could be for naught if the sun's position catches reflective surfaces and causes glare. Cover shiny and reflective surfaces with burlap sandbags. See picture, right.

Exhaust Systems. Exhaust systems create a very hot, very distinct shape that is visible clearly with thermal optics. Expedient methods of camouflaging them include building 'cages' around the exhaust from discarded HESCO barriers covered in cammie netting (3d Light Armored Reconnaissance Battalion does this quite well), or affixing discarded ammo crates around the exhaust system. Regardless of method, the base idea is to create space between the exhaust system and the camouflage material to allow heat to dissipate, thereby masking its thermal signature. Picture, left shows the distinct outline of a HMMWV exhaust.

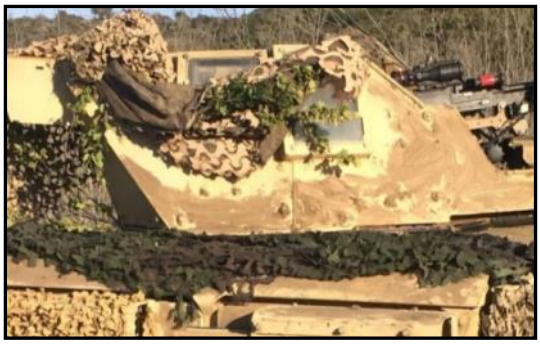
Create space. Thermal camouflage depends on reducing or masking heat signatures. For instance, camouflage netting on an engine hood quickly becomes just as hot as the hood, negating any thermal effects. Creating space between a hot object and its camouflaging layer decreases its thermal signature. Styrofoam blocks from the TOW missile wooden overpack (picture, right) are useful for creating this space. Affix them on the vehicle and lay the cammie netting on top. This creates a space for heat to dissipate, reducing the thermal signature.

Camouflage Your Vehicle cont'd

Third Battalion, First Marines CAAT Section. Photo courtesy Captain Garrett Loefelmann, 2017

Line and Outline. Tactical vehicles have strong and distinct lines. These distinct lines and outlines are the reason they are easily recognizable. Camouflage—specifically local vegetation—should focus on breaking up the lines and outline of tactical vehicles. Mirrors, exhaust systems, antennae, hoods and wheels should all be considered (pictures, right).

Boot bands and hair bands are ideal for "vegging up" antennas. In the picture at left, Marines from Company B, 3D LAR tied vegetation on to their antennas. The antennas were invisible at 200 meters.



Mud, charcoal, ash and other natural mixtures are ideal as a base layer of camouflage. Apply liberally to wide, flat surfaces (picture, left).

Camouflage—especially camouflage netting—should be loosely fit and avoid harsh lines. Camouflage netting for tactical vehicles should be garnished with wide strips of conditioned burlap and tie-ties. In the picture (right) cammie netting is rolled up on the vehicle flanks. When in position, the netting is unrolled to cover the wheels. This netting can be staked out away from the vehicle as an extra measure. Wheels are a key thermal identifying feature on tactical vehicles.

1st Light Armored Reconnaissance Battalion, 2017

Notes on Vehicle Camouflage

Thermal camouflage. The goal of defeating detection by thermal optics isn't to reduce the thermal signature to 'zero' but to disrupt the shape of the object, and make it blend in with the surrounding thermal environment. Typically with vehicles, the key to success is to create space between the vehicle and the camouflage layer. The easiest—and most preferred—is to place vehicles in areas with overhead cover.

UAS. One of the most distinguishable key identifying features of vehicles from the air is cast shadow. When overhead concealment is not available, passive measures for mitigating cast shadow include parking vehicles in wide ditches, dried river beds (with due caution for flash floods), and between micro-terrain.

Notes on Camouflage

Veg Site. A critical task for a squad is to establish a “veg site” as a tactical control measure ahead of camouflage intense patrols (ambushes, e.g). At the veg site, the squad halts and ‘vegges up’ before continuing. This lessens the impact of cutting veg in the objective site.

Harvesting Vegetation. When ‘vegging up’ always cut vegetation; never pull it from the ground. When vegetation is pulled from the ground, the root system is typically pulled up as well. This tends to be lighter in color than the rest of the vegetation, and can cause a unit to be compromised. Trauma shears work well for cutting most vegetation.

Sandbags. Due to shine, burlap sanbags are preferred over synthetic/plastic ones. The shine from synthetic sandbags can be seen from sUAS from distances in excess of 500 meters. Additionally, as burlap sandbags become unserviceable for use, Marines can strip them for jute.

Use fabric spray paint for cammie netting or jute when preparing; regular spray paint will catch on fire when you laundering it during the conditioning process.

It is best to start with a lighter brown base color-it is easier to darken objects than to lighten them.

Night. Camouflage is just as important at night. Night optics still see line, outline, shape and shadow (picture, right).

Weapons. When time and materials allow, rifles should be painted. Traditional rattle-can paint will suffice. Even painted, rifles are ’vegged-up’.

Service rifles are often ‘cleaned’ to excess—areas of the weapon are often very shiny. A hasty method to subdue their shine is to apply camouflage paint to those areas. Areas usually subject to shine from excessive cleaning are the compensator, barrel and ejection port cover.

Topic

Water
Silencing Water
Procure Water: Snow
Using an Inline Water Filter
Notes on Water

Quietly Clip Clips

Make a Ranger Roll

Rucking
How to Pack a Ruck
Splinting a Broken Ruck
Notes on Rucking

How To Make a Tarp Shelter

MREs

Hygiene

Dry Socks While on the Move
Fleece
Ruck

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Silencing Water

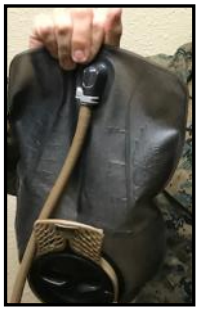
The sloshing sound of water is a dead give away for a unit looking to move silently into position (in ambush, for example). It is a good habit to check for sloshing water during pre-combat checks.

Sloshing water is generally caused by half-full canteens, nalegenes, or camelback water sources that still have air in them (picture below).

To stop sloshing in a canteen or nalgene, simply fill the canteen or nalgene to the very top. When the unit stops to rest, the unit drinks from one canteen or nalgene until it is empty, avoiding the half-full sloshing when the unit moves again. Units at rest should drink from canteens or nalgenes; units on the move or in the attack should drink from their camelbacks.

Half-full, air-filled camelback are noisy and the trapped air makes camelbacks pop open, spilling the water everywhere (below, left). To stop sloshing in camelbacks, and to remove air that causes camelbaks to pop open, simply turn the camelback upside down. Using the hose, suck all the air out of the camelback (picture below, middle); it should be relatively flat when the air is sucked out (picture below, right).

Air Filled Camelback



Procuring Water: Snow

For illustrative purposes, we are using a Jetboil stove. The process is the same with a Squad Expeditionary Stove, or like-item.

Search for an uncontaminated area (no trash areas, human waste). Gather a small amount of snow. It is important to note that if you begin by packing your Jetboil full of snow, it will take longer and use more fuel.

Melt this small amount of snow, and bring to a rolling boil. There should be about two inches of water in the bottom of the Jetboil.

To this, begin adding snow. Add 3”-4” of snow at a time, and stirring consistently. Do not worry about bringing the snow to boil.

Repeat this process until your Jetboil is full. Bring the water to a rolling boil for 30 seconds.

Using an In-line Filter

To use the issued in-line filter:

Disconnect hose from bladder. Reconnect in-line filter, and attach hose. The resovoir is filled with water from the source. As you drink from the tube, the in-line filter cleans the water to acceptable standards.

This filter is protects against bacteria, protozoa, and particulates down to .02 microns in size. It does not protect against viruses. It does not protect against Leptospirosis (a bacterial disease caused by bacteria genus leptospira, which is smaller than .02 microns)

.

Notes on Water

In freezing temperatures, store water upside down. This will allow you to drink unfrozen water at the bottom. For cold weather areas, Nalgenes are preferred due to their large mouth.

If you must harvest water from a stream, maintain one “clean” Nalgene and one “dirty” Nalgene. Harvest water in the “dirty” Nalgene. Once sanitized by boiling (or other methods), pour water into the “clean” Nalgene. Do not cross-contaminate the Nalgenes.

If your Nalgene lid is frozen, tap it against hard surface to loosing ice in the lid.

Do not use Camelbaks in cold environments. Latent water in the hose and mouthpiece could cause the system to burst. If you have no other choice, attempt to keep the Camelbak bladder between insulating layers. Blow into the drinking hose to clear water from the line. Route the hose under the Gortex jacket, and through the sleeve to keep the drinking tube from being exposed to wind and snow.

Quietly Clip Clips

When in a patrol base, ambush site, or other place where you can't make a lot of noise, the distinct *click* sound can be heard for a considerable distance, especially when a group of Marines are doing it.

Quietly clip your clips by inserting the male end. When the clip is almost in, place fingers on each side of the female end to 'catch' the clip as it snaps in.

This method greatly reduces the sound that clips make.



Make a Ranger Roll

A ranger roll is made from a poncho and poncho liner. It offers a light-weight, multi-use sleeping option in milder weather.

Neatly lay out your tarp. Over this, lay out your unzipped poncho liner. Align the gromets on the tarp with the ties on the poncho liner. Tie the poncho liner to the grommet with a bow tie. Zip up poncho liner and snap the tarp shut where the ends meet.




Rucking: How to Pack a Ruck

Rucks are packed to maximize efficiency. Individuals pack their ruck with their gear in the same place each time.

General Guidelines apply:
Heavy items are packed 'high and centered' on the individual's back. Light items are packed in the bottom and outside.

Carry the same gear all the time. When possible, keep gear out of the top lid. Reserve the top lid for maps and mines.

Organize gear according to use. More frequently used gear is kept accessible.

The standard is: A Marine finds his gear silently, in the dark, without a light.

Balance and compression are critical to load carriage.

Balance. Rucks are packed for balance when moving. Heavy items are not packed on one side. Hydration pouches are worn on the side, preferably one on each side. Improperly packed rucks cause the Marine to work to offset the effects of an unbalanced ruck.

Compression. Compression straps on each side of the ruck compress gear. Tightly compressed gear decreasing the shifting of the load, and makes movement more efficient. When loads shift inside the ruck, the Marine exerts more energy and effort. All compression straps are used, and the load is tight and secure.

Roll Straps. All straps are rolled and secured. Rucks do not look like "gear bombs.' Disorganized gear is harder to use.

Rucking: Making a ‘Splint’ for a Broken Ruck

Ruck frames break, and that’s a fact of life. Temporarily fix a broken frame by splinting it.

Start with a straight object (in the pictures below, a broom handle was used. Any object will work: tree branches, for instance) for a splint. Lay the splint next to the broken frame. Align the frame as best as possible.

Using tape, 550-cord, or whatever is at hand, lash the splint to the frame.




Notes on Rucking

Pack your ruck the same way every time; chow goes in the same place, hygiene kit goes in the same place and so on. With time and practice, you will be able to find your gear silently, in the dark and without a light.

Sustainment pouches are for sustainment. Keep an MRE and field coffee in one sustainment pouch. Rifle cleaning gear, baby wipes, beanie, hygiene gear goes in the other sustainment pouch.

Compartmentalize as much as possible by using ‘mac sacks’ or homemade waterproofing bags. Pack all socks in one bag, warming layers in in bag, etc. By compartmentalizing, Marines access gear quickly and efficiently.

Make a Tarp Shelter

"Build a tarp shelter, in the dark, in ten minutes"

To build a tarp shelter you need one issued tarp, four tent stakes, and two uprights. Uprights can be any sturdy object; recommend 24-36" long. Tent pole sections work well, can be acquired easily, and are lightweight. Plastic tent stakes are readily available at retail stores and are packed in the ruck.

Spread out tarp and stake to the ground. Ensure that the tarp bungees are taut. Drive stakes in at a 45° angle. Put uprights in, ensure that they are seated in the gromet of the tarp. In the absence of brush or trees, you ruck and gear can be hasty uprights.

Upgrades: risers at the corners. Guy-lines on the uprights add stability.

Guy-Line *Risers*

How to Pack Trash

Pack your trash out. Personal trash is packed by the individual in their ruck, and periodically gathered via the Company Gunny.

MREs can be packed so that trash doesn't become messy in your ruck.

Roll up main meal pouches. Fit them in 'dry' pouches (crackers, for instance). Break spoons in half. Stow everything neatly in the MRE pouch.

Fold one half of the MRE pouch down, and behind all the trash, leaving one side up like an envelope flap. Tuck this flap into the pouch. When done well, this method keeps all the MRE trash in the pouch, and will not explode in your ruck.

Hygiene

For our purposes, hygiene includes keeping yourself clean, urinating and defecating. Hygiene is of the utmost importance to a unit in the field. Much like echeloning combat loads, hygiene kits are broken up in units of time. Basic loads include: the four day hygiene kit, the four week hygiene kit, and the four month hygiene kit.

Four Day. A sample four day hygiene kit (picture, right) includes a four inch toothbrush, 1 oz toothpaste, one razor with handle, anti-itch cream, Chapstick, hand sanitizer, and a small microfiber towel. It weighs less a pound and is packed in a homemade waterproofing bag. Each item is individually waterproofed to avoid the mess that happens when one item gets crushed. Toilet paper for four days is waterproofed and carried separately. Essential items only, no extras.

The Four Day Hygiene Kit

Four Weeks. Include replacement items: razors, toothpaste. Additional items: shaving cream, nail clippers, bath towel, bar soap in a waterproof case (chewing tobacco cases work well.

No gel body wash! It may get crushed and explode in your gear. Gel body wash is heavy and hard to pack.

Chewing tobacco tin as soap container

Four Months. Replacement Items: Razors, Soap, shaving cream, toothbrush, toothpaste. Additional Items: Dental Floss, Scissors, Deodorant, bath towel and flip-flops,

Plan for upgrades to each echelon of gear. Plan to be your own resupply when your gear is brought forward, or when returning to a rear area.

Shaving and Cleaning
No electric razors; they are too noisy for tactical work.

Carry hand sanitizer for use before and after eating. Corporals supervise field hygiene.

Shaving removes protective oils from the face. Shave in the late afternoon or evening to allow protective oils to reconstitute.

Do not use alcohol-based baby wipes. They contain alcohol and are the same temperature as the ambient air. Their use could lead to contact frost-bite in cold weather.

Field showers are accomplished with baby wipes or micro-fiber towel. At minimum, Marines clean their feet, crotch and armpits. Used baby wipes are discarded in empty MRE sleeves.

When shaving or brushing teeth, dig out a small hole with the heel of your boot. Spit into this hole. Cover with dirt when you are done.

Hygiene con't

Using the Head
Urine smells. Dig a small hole with your boot heel and urinate into it. Cover hole with dirt.

Excrement is a reflection of diet. U.S. excrement smells different than the enemy's. Minimize smell by burying all excrement immediately. Dig individual catholes when mobile. Designate saddle trench when static for hygiene standards and minimizing smell. Saddle trenches are 50 meters away from water features and down wind from enemy. For saddle trenches, all excrement must be covered immediately!

Carry excrement in plastic bags out of area of operations; certain missions may require this to avoid evidence of activity.

Use an antidiarrheal to avoid having to defecate. This is NOT recommended by doctors, but can be used in certain missions (i.e. ambushes).

When using the head, place loose belt buckle in front trouser pocket for noise discipline.

Always wash hands with sanitizer and water after using the head.

Drying Socks on the Move: Cheetah Fleece and Belt

Dry your socks are you move. Some issued gear (such as the 'cheetah fleece' and happy suit) have mesh pockets perfect for drying socks.

Another method is to tuck socks into your waistband.

Both of these methods are useful when you bed down for the day.

Drying Socks on the Move: Ruck

Dry your socks on the move by hanging them off of your ruck.

It is recommended to carry two bungees. When you need to dry socks, simply tuck them into the bungee.

If there are no bungees, tuck the socks through a compression strap.

5

Drying Gear at Night

When drying clothes at night, place small items in your sleeping system. Small items include skivvy shirts, underwear and socks. Do not wear wet clothes to sleep! Place items toward the feet, or between legs.

Items such as utilities are place between the sleeping bag and the bivvy sack. Body heat will dry them.

Bulkier items—Gortex, for example—is laid between the sleeping system and the ISO mat.

Notes on Living in the Field

Sleeping
Sleeping is a crucial function. When afforded the opportunity to rest, sleep is maximized.

Remove blouse and roll as pillow.

Remove boots. Put boot bands and pocket items in boots. Put cover over boots to keep animals out.

Loosen trousers and socks. The weather and enemy determine what is worn while sleeping. Boots are worn while sleeping if the enemy is close.

Carry a hammock. In wet terrain, a hammock allows the body to dry overnight. Sleep in dry night shirt, put wet clothes back on in the morning.

Marines who snore should be turned on their stomachs.

Minimize equipment. Use homemade waterproofing bags to organize contents of pack by function. Before bedding down, Marines pack away all gear. Marines are able to wake up, and move out in minutes.

Except for one-night missions, ISOMAT is worth carrying for effective sleep. Knee boards suffice for ISOMATs if needed.

When sleeping, place your helmet over your boots. In the event of rain, the helmet keeps your boots dry, and your boots provide a platform to keep the inside of your helmet dry.

Do not wear wet clothing in your sleeping bag.

The perfect amount of water necessary to heat up an MRE is a mouthful. Pull a mouthful of water, then spit into the MRE heater.

When able, socks and boots are removed. Allow feet to air dry and massage gently. Allow socks to air out. 'Dry launder' socks and leave in the sun.

Wrap your tarp in your ISOMAT strapped on the outside. During halts, the tarp is easily accessible for map checks.

Cover gear at night. If you are not using your tarp for shelter, cover your gear to protect from rain or dew.

Practice a Hard Routine. Hard routine includes noise and light discipline exercises, limited packing lists to accustom Marines to living light, scavenging water, and night movement. NO lights, NO MRE heaters.

Topic

LZ Marking
LZ Marking: How to Make a Desert Box
How to Use a Signal Mirror
Staking Chemlights
How to Make an IR Buzzsaw
How to Make an M203 Strobe
LZ Marking: Obstacles
LZ Marking: Airpanels
Nato Y Day and Night

How to Mark a Breached Lane at Night

Make a Directional Signal
Other Directional Signals

Notes on a Signal Plan

Landing Zone Marking

There are two types of marks (called initial terminal guidance—ITG) in LZ Procedures: Near and Far ITG. Far ITG is used to orient the aircraft to the zone, and near ITG is used to cue the aircraft to the specific landing point. ITG is planning both near and far, day and night, primary and alternate.

The methods below are not inclusive.

Methods of Marking an LZ:
Day, near: Smoke, Air Panel,
Day, far: Pyrotechnics, Signal Mirror,

Night, near: IR Strobe, IR Buzzsaw, 'Desert Box', NATO Y
Night, far: IR Pointer (PEQ-16 or equivalent), Pyrotechnics,

Best practice: Mark for LZ and friendly units is different. Mark LZ with chem lights, friendly positions with IR Strobe, for example. During the day, if the LZ is marked by air panel, friendly units should not be.

Similarly, if obstacles are marked by IR chemlight, then near ITG shouldn't be a stationary chem light, as in a NATO Y.

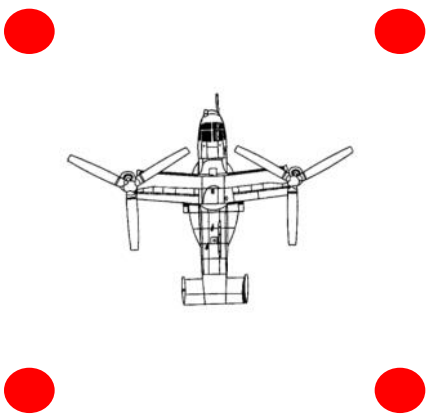
LZ Marking: How to Make a Desert Box

Desert Boxes should be large enough (roughly 60-75' square) to allow for the fuselage to fit inside the box.

Stake four points (airpanel—day, chem light/chem light water bottle—night) in a square.

This is an incredibly easy and incredibly successful method of marking landing points for aircraft. It does take a few minutes to set up, and so not the best choice for hasty or unplanned landing zones.

For chem light water bottle desert box, fill any clear plastic container with water. Drop in an activated chem light. Tie 550-cord around the neck of the bottle and stake it in the landing zone.



How to Use a Signal Mirror

"Catch" the sun's angle of incidence by holding out your hand until to see the reflection (below, left). Once you have the angle of incidence, extend your hand and make a 'V' with your fingers (below, middle). Ensure the flash stays on your hand. Place the aircraft in the 'V' and sweep the flash up and down. The flash is visible on the hand in picture, below, right.

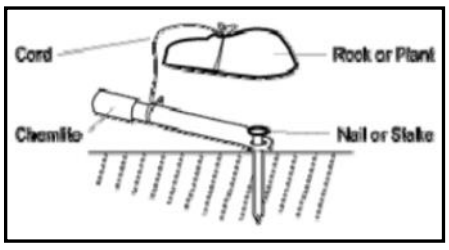
Each time you sweep the bright reflection across the top of your V-shaped fingers you are sending a flash of light to the aircraft.

It is important to not that the angle the sun hits the mirror (angle of incidence) is the same angle that will be reflected to your target (angle of reflectance). The rule is: The angle of incidence is the same angle as reflectance.

LZ Marking: How to Stake Chem Lights to the Ground

For LZ procedures, chem lights and other objects must be staked and secure. For chem lights, an easy solution is to carry #10 or heavier nails in your LZ Kit. The nail is pushed through the hole in the chem light, and doubly secured by tying the chem light to a rock (or something!) as seen in picture, below.

An alternate method is to tie the chem light through the hole (*not* the hook), and then tie it to a common tent stake. Ensure to push the stake in until it is flush with the ground



LZ Marking: How to Make a Buzzsaw

Making a buzz saw is relatively easy. You need two chem lights and an eight-foot piece of 550 cord. Due to visibility, red or IR is preferred)

Remove the 550 cord innards (keep them for the terrain model kit), tie one chem light approximately 24-36" from the end (picture below, right). Tie the second at the end (picture below, middle). Wrap everything neatly (picture below, right).

For farther signaling, tie 3-4 chem lights to the end of the buzz saw.

LZ Marking: Hasty Strobe with an M203

When manufactured strobes are not available, make a hasty directional strobe with an M203. Simply crack a chem light, and slide it into the barrel of a M203. Place your hand over the barrel, and flash the aircraft in a recognizable pattern (for instance three flashes, pause, three flashes).

This is an incredibly efficient method of near ITG and can be used as far ITG. It is very directional—good for a fluid enemy situation—but you must know the direction the aircraft is approaching or it won't be seen.

LZ Marking: Marking Obstacles

Obstacles on the landing zone must be moved or marked. If they are marked, the best practice is to make your obstacle mark usable during the day or night. Additionally, every attempt must be made to differentiate obstacles marked by chemlight, and landing points marked by chemlight. One method to separate the two is to place landing point markers in a clearly identifiable geometric shape.

A method of marking involves engineer tape (e-tape), red spray paint, and red chemlights. Spray paint the e-tape and cut into 5-foot sections. Tie chemlights onto each side. This mark now works for day and night, and also functions as a 'foxtail' for urban areas.

While not necessary, red paint helps to separate the obstacle mark from the landing point mark.

VS-17 Air Panel, cut into strips, or any other brightly colored material work as an obstacle mark.

LZ Marking: How to Stake in an Air panel

Due to rotor wash, it is imperative that you secure all forms of ITG left in the landing zone.

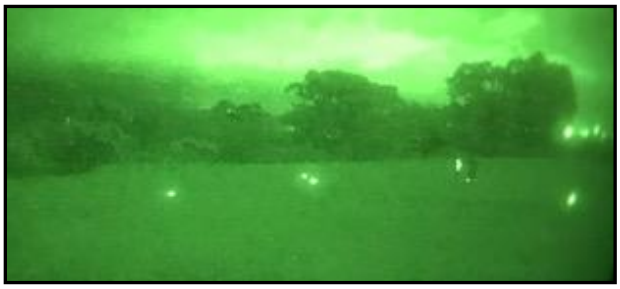
Standard tent stakes are preferred but nails heavier than #10 work. Simply tie stakes to all four corners of the air panel, and stake to the ground. Ensure to drive the stakes all the way into the ground.

In a pinch, a sand bag will work as well (picture, right).

The standard issued water-proofing bag can act as a hasty air panel. To secure it, tie 550-cord through both buckles, and tie it to a common tent stake. Fill the inside with a few large rocks (picture, below center with stakes circled).

Airpanels tied to sandbags work well.

NATO "Y" - Day and Night



The NATO Y is a common near mark for aircraft entering an LZ. While the dimensions of a NATO Y are well-covered in the field manuals, methods for making them are not.

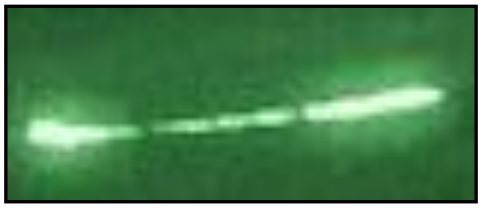
Night NATO Y is best made by chemlights. Like most marking techniques, anything left in the zone must secured so that it doesn't get sucked into the aircraft's air intake.

Break chem lights and insert them in clear water bottles. Tie 550 cord tightly around the neck of the bottle and stake it into the ground with a common tent stake. The water magnifies the chem light, producing the picture (above, right).

Chemlights themselves can be staked directly to the ground to form a NATO Y .

Daylight NATO Y is best made by air panels staked to the ground.

Marking a Breached Lane at Night—The Muntzing Method



Breached lanes are often marked with engineer tape unraveled from a 'football' (a football is a common name given to an object that holds engineer tape used to mark a breach lane). While white engineer tape is sufficient for the day, night time marking is often more challenging.

This method allows for easily 'hand-railing' a breach. Construction occurs during prep for combat.

You need a plastic container, approximately 20 IR chemlights and as long a piece of engineer tape as you need to mark your breach.

Activate the chem lights and gently cut the tops off. Pour the chem light 'juice' into your plastic container.

Cut a hole about the size of a dime in the lid of the container. Tie a large knot in one end. The knot should be big enough that it cannot pass through the hole in the lid. This is the standing end.

Back lay engineer tape in the bottle. Screw on lid, and tie an empty chem light to it. This chem light is the running end. Let it soak for as long as you can. Ensure you soak all of the engineer tape by periodically moving the bottle around.

The result is an easy to follow IR trail in the picture above, right.

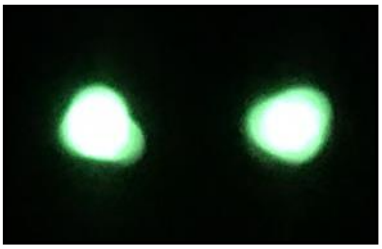
Make a Directional Signal

As part of a robust signal plan, directional signals allow you to mark things without light spillover from chem lights.

This hasty method requires a piece of card board, chem lights and some tape. Cut the shape you desire. Under night vision devices, color doesn't stand out, so you are relegated to number or shape (as in two lines, one or more dots, and so on).

Tape chem lights to the cardboard. Tape the chemlights to the cardboard. "Sandwich" another piece of cardboard on the enemy side to ensure that no light spills out. The 'friendly' side displays the necessary message in accordance with the signal plan.






Other Directional Signals

Any method that shows 'friendly' side while not showing on the 'enemy' side is a directional signal. Anything that can contain the mark and be masked from enemy units works. In the pictures below, a drink bottle is used and a chemlight is taped directionally and nailed to trees.



Notes on a Signal Plan

Signals should be simple, clear, and redundant

Clean/Dirty Pit. Handling EPWs depends on a strong signal plan. Signals for clean and dirty pits for night work include using orange chem lights for 'dirty' pits and 'white' chem lights for clean pits.

Work with IDF. Fire for effect is a fantastic signal both day and night. Additionally, machine guns occupy their support by fire upon fires for effect. Fires for effect are called for by the commander, and signal the tripping of MSL/MSDs.

Standard Marks and Colors. SOPs for marking, signaling and targeting at night differ from unit to unit and are sometimes dangerously contradictory. No Marine Corps SOP exists. Unit leaders assign as few marks as needed to aid control and situational awareness. IR is always primary. Visible light is secondary. IR is one color. Marks can only be differentiated by intensity, number, or flashes. Plans cannot be dependent on markings. Enemy can mark, marks can fail, and marks can be confused. The enemy may have IR sensors.

Night Marking Conventions. All Night Marking SOPs follow the following guidelines:
Intensity indicates importance.

Flashing indicates importance.

Flashing IR beacons are significant and are reserved for a few key billet holders. Leaders are marked with either steady or flashing marks.

Fixed sites are always marked with a steady IR mark. Regardless of importance, fixed sites never flash.

For signaling, international distress signals apply.

Standard signal meanings:
One of anything is NO. Two of anything is YES. Three of anything is DANGER.

For positioning, nautical navigation SOPs apply. RED is LEFT. GREEN is RIGHT. IR equivalents: two IR chemlites replace RED. One IR chemlite replaces GREEN. First priority for marking is always the LEFT side.

Attacks. During attacks, traffic rules apply. RED means STOP, or CEASE. GREEN means GO or CONTINUE. YELLOW is reserved for link up of units.

Topic

Clean Comm Ports

Water-Proof Radios

How to Talk

Naming Conventions

Comm Windows

Shackle Codes

Cold Weather Comm Considerations

Clean Comm Ports

If you have a bad connection on radios, clean the comm ports with the eraser of a No. 2 pencil.

Program a Radio in the Cold

When wearing thick cold weather gloves, program a radio with the graphite end of a No. 2 pencil.

Lubricate O-Rings

Cold weather tends to cause the O-Ring in most comm ports to become brittle. Typically, in warmer Climates, wiping saliva on the O-Ring with a finger does the trick to help the connector seat.

In cold weather, Chapstick functions as a good substitute for saliva. Put chapstick on your finger (picture, below left) and work it into the O-Ring (picture, below right).

Battery Life

Cold environments kill battery life. Improperly stowed radios (picture, right: setting a radio in the snow) can kill batteries in a matter of hours.

A method for keeping a radio ‘warm’ is to waterproof the radio. Place radio inside an issued warming layer (poncho liner, as depicted below) and place inside a water-proofing sack.

Leave the antennae exposed.

Waterproof a PRC-152

Start with any plastic bag (MRE sleeves work well too). The radio should slide in so that the closed portion of the bag is at the top (Pictures, right).

Cut small holes for handset, antennas, and other connectors. Thread them through the holes so that the plastic bag is over the connectors (picture, left).

Tape the connectors securely (picture, right)

Secure the loose, open bottom of the bag with a boot band or rubber band. This allows you to easily change batteries, and lift up the bag to program the radio (picture, right).

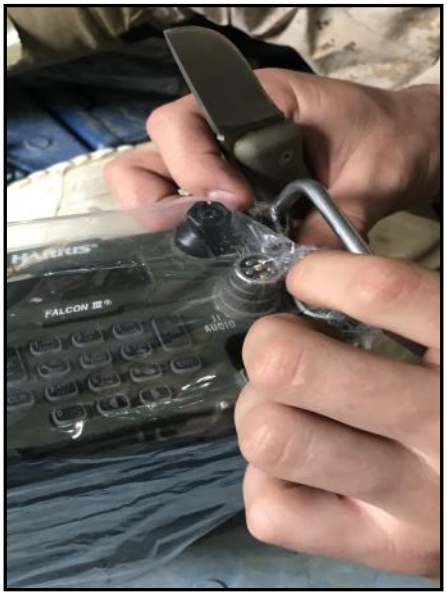
Waterproof PRC-117

Start with a large plastic Ziploc bag. Place it over the radio so that the closed end is at the top (picture, right)

Carefully cut small holes for any port connectors and rails. Install connections and pull plastic down.

Using this method, you can still program the radio with the normal interface.

Tape openings shut around the port connectors. Secure the loose bottom of the plastic bag with boot bands or a rubber band in order to change batteries easily.



How to Talk

Radio Discipline. It is key to concise communication. It requires practice. Radio discipline consists of:

Talk Short. Your radio can kill you. Short, concise communication prevents enemy location, targeting and jamming.

Think before you transmit

Unkey at five second intervals. Do not say 'break'.

"Break" calls are to interrupt a conversation or to start a conversation with a new station on the net.

Do not say 'this is.' When possible, drop 'over.'
Do not use double call signs. After first transmission, drop callsigns altogether.
"Out" is out. Do NOT respond. The caller terminates his own transmission.

Talk Correct. Get rid of unnecessary chatter that is a product of bad habits.

Garbage	**Correct**
Affirmative	Yes
At this time	Now
Be Advised	**Garbage**
How copy?	Read back
Interrogative	**Garbage**
Loud and Clear	Roger
Lima Charlie	**Garbage**
Solid Copy	Roger
Send it/Send your Traffic	**Garbage**

Talk Secure.
Do not say sir, or imply seniority. Do not pass friendly grids in the clear (reference SHACKLE codes). Pass enemy grids in the clear. Say "BEADWINDOW" to identify a security violation.

Use Correct Radio Procedures
Radio Check. Do NOT overuse. Radio checks occur with new stations, after troubleshooting, battery change, or after changing frequency

"Blue 2, this is Green 3, radio check, over."	Drop 'this is'
"Green 3, this is Blue 2, lima charlie, how me, over."	Response is 'Roger, over'
"I have you same, Green 3 out"	Drop callsigns. Response is 'Roger out.'

Use "Wait, out." Tells another station that you will call back later.
"Black 6, Blue 1. Enemy Contact. Wait, out."

Callsigns are an affirmative response. Respond with callsign if transmission is heard and understood.
"Brown 1 this is Black 6."
"Brown 1."

Pass "GINGERBREAD" if you suspect enemy stations on the net.

Authentication. Avoid if possible.

Eavesdroppping. Eavesdripping is encouraged. Listening to other nets, especially HQ, helps situational awareness.

Leaders talk to leaders. To minimize friction, leaders, not radio operators, need to talk directly to each other as much as possible.

Use absolute time hacks. "Move at 1530" vice "Move after 30 minutes." Relative time hacks are easily misunderstood and get passed along with inaccuracies.

Shackle Codes

When passing friendly grids in the clear, an easy encryption method is the shackle code. A shackle code is a ten letter word that corresponds to a number when it is written out (see picture below).

0	1	2	3	4	5	6	7	8	9
S	C	U	B	A	D	I	V	E	R

Using the standard shackle code SCUBADIVER, a friendly grid of 264 387 would be passed as “Uniform India Alpha, Bravo Echo Victor”.

For extra encryption, shackle codes can be ‘marked.’ Marking determines the location of zero. From zero, numbers are filled in (example below).

Example Shackle Code, “Mark Victor”

3	4	5	6	7	8	9	0	1	2
S	C	U	B	A	D	I	V	E	R

In this example, a friendly grid of 264 387 is passed as “Shackle code, Mark Victor. Friendly Grid: Romeo Bravo Charlie, Sierra Delta Alpha”.

Shackle codes are briefed in the Command and Signal portion of the 5-paragraph order.

7

Comm Windows

Comm windows require trust and are set according to a predesignated schedule.

During Comm Windows, pertinent information, reports, and position reports are passed. Once over, Comm Windows are not broken except in emergency.

Comm Windows are not established along easy patterns. Units getting radio checks at the top of the hour, for instance, invites pattern recognition.

Establish Comm Windows before the unit departs, as in the below schedule.

Time	0035-0040	0245-0250	0410-0415	0642-0647	0813-0818	1047-1052	1233-1237

Secondary/Lost Comm procedures are established as necessary.

Topic

Halt Procedures
Long Halt Procedures
Short Halt Procedures
Moving from a Halt

Waterfall method of scanning

Occupying Positions

Patrol Bases
Cold Weather Considerations for Patrol Bases

Snow Patrolling

Occupation of Positions

Noise Discipline

Notes on SLLS

Halt Procedures: Short Halt

If you are not moving, you are defending. Patrol halts are a form of defense, that is individuals in the patrol take actions to steady increase the unit's defensive posture over time.

Short Halt Procedures
Patrol halts; individuals provide outboard security. Unit conducts SLLS.

Once the unit is comfortable that it is not being followed, individuals in buddy pairs:
Maintain security. One Marine remains standing while their buddy slowly takes a knee.

Once in a knee, the standing Marine slowly kneels.

With both Marines kneeling, one Marine gets into the prone.

Once in the prone, the other Marine gets in the prone.

Once all Marines are prone, the unit conducts SLLS.

Halt Procedures: Long Halt

The only difference between a long halt and short halt is time. The unit continues to improve its defense until such a time as the unit leader directs that they move. Short halts become long halts without the direction of the unit leader.

Long Halt Procedures
The unit leader issues sectors of fire to its immediate subordinate leaders (fire team for squad, squad for platoon, etc)

Unit leaders place their heaviest automatic weapon along expected avenues of approach

Extra ammunition is staged by automatic riflemen

Chow and water plan established: one Marine eats while another holds security.

ACE reports are given by subordinate units. ACE reports drive consolidation; consolidation does not drive ACE reports.

Halt Procedures: Moving from a Halt

The unit gets out of a halt using halt procedures in reverse:
Point man takes a knee and reassess the environment.

Point man stands. Number 2 in the order of movement takes a knee.

Point man begins walking. At the desired interval, number 2 man stands to support the point man.

This pattern continues through out the patrol: the members of the unit in the prone provide security for those in the knee. Those in the knee provide security for those in the standing and so on.

The patrol DOES NOT stand at once. This violates security principles, and leaves the squad vulnerable to enemy by presenting one large signature.

Cold Weather Considerations for Patrol Bases

Track.
Track discipline is essential when occupying a patrol base in a snow-laden environment. Tracks in the snow can be seen by enemy UAS from a considerable distance. To disguise numbers and locations, Marines use one track to traverse the patrol base.

Trash.
While occupying a patrol base, burying and burning are the least preferred method of trash disposal. Marines pack away their trash. Burying is least preferred, as trash pits are hard to dig on the frozen ground.

Hygiene.
Place latrines downwind and at least 100 meters away from snow collection points. Discipline is required; Marines must only used designated areas for head calls to avoid contamination with procuring snow to make water. Alternately, units designate one tree for urinating. No water is collected from the area surrounding this tree.

Snow Patrolling

The terms broken and unbroken trail have specific meanings. When moving through undisturbed—or unbroken—snow greater than 12 inches, the lead two or three Marines have to pack the snow for the rest of the file. Once accomplished, the trail then becomes broken. The lead personnel will exert more effort and will need to be cycled to the rear of the formation every 15 to 30 minutes.

The recommended formation for snow travel is ranger file: it allows for maximum efficiency of trail-breakers, while disguising the number of Marines in the movement from enemy UAS.

Route planning should include maximum use of overhead concealment. Often, snow-laden environments have considerable alpine trees. Use the trees to mask the track of the patrol from enemy UAS.

Leaders only deploy into other formations when enemy contact is eminent.

8

"Waterfall" Method of Scanning During a Patrol

While publications write about the need for patrol members to look back every 3-5 paces, this often does last long into the patrol. The 'waterfall' method of scanning during a patrol keeps patrol members honest about scanning their sectors at regular intervals. The method is simple, and is based on the actions of the point man:

Point man scans his sector; turns and makes eye contact with the next Marine in formation. In doing so, he scans his flank sector. Point man scans his flank sector again as he faces the front.

Upon eye contact, the second in formation immediately begins their sector scan, making eye contact with the next Marine in formation.

The process continues to the rear of the formation. As the patrol 'waterfalls' their scan, the point man begins the process again.

This action relies on the discipline of the point man. When properly executed, front and flank sectors are continuously scanned from multiple angles. Individual scans should not be quick; each scan is deliberate and detailed. The patrol is hunting, not hiking.

Occupation of Positions

Many tactical positions are occupied using the same basic method. This method—with few variations—is adapted for units to occupying observation posts, objective rally points, ambush positions, defensive positions, or actions at similar tactical control measures. Patrols must be able to occupy positions without sacrificing security or accountability.

The patrol stops short of its objective. When occupying an ORP, it stops short of the ORP as well.

Leader's recon occurs. Leader's recon includes the PL and the security team. If selected for occupation, the PL leaves two Marines as security. The PL, plus one security Marine, return for the remainder of the patrol. The APL and PL never recon together.

The two security Marines left at the objective assume two roles: point security (designated as 12 o'clock) and MACO (designated as 6 o'clock). MACO is responsible for accountability of the patrol, and for designating security positions for inbound Marines.

Patrol occupies a hasty perimeter without dispersion. Especially true for squads, tight, temporary perimeters offer better fire distribution, accountability, and control.

Once the patrol is accounted for, and SLLS conducted, the unit continues the mission (see 'Short Halt' and 'Long Halt' procedures).

Noise Discipline

Tape all loose gear to prevent objects from hitting each other and making noise. Black electricians tape or green cloth tape works well.

Tape weapons sling hardware.

Tie all loose straps to prevent objects from hitting each other and making noise.

Wear gear tight. Except when resting, belt should always be buckled. Gear should fit: this is a PCC item for NCOs. Improperly worn gear makes more noise and makes you more uncomfortable.

Avoid wearing the Gortex. Rain hitting the Gortex makes distinctive noise. Unpacking it, putting it on, and taking it off all make noise. Vegetation catching on the Gortex makes noise.

Carry canteens either full or empty. Avoid letting canteens make sloshing sounds. Either drink all of one canteen or let it stay full.

Know where your gear is and how to retrieve it silently in the dark. Minimize equipment. Use resealable bags to organize contents of pack by function.

Turn off all watch alarms. Do not use smart watches. Leave cell phones at home bases.

Turn down radios. Clip headset to helmet. Run radios squelched. Minimize radio use. Communicate with the radio by handset clicks (once for no, twice for yes).

Insert cardboard into SAW drums/M240 cans to silence plastic drum sounds. Insure belt can freely fire. Remove cardboard if it gets wet.

Do not flick weapons safety. Hold it and slowly turn or push switch.

Run ‘hard routine’ noise discipline: no voices, no loose equipment.

Notes on SLLS

Do not wear the Gortex hood. It reduces hearing ability.

Do not cover ears with wool cap. Remove helmet.

In defensive positions, use nuisance obstacles, such as wired cans with pebbles, to warn of intrusions.

Learn normal background sounds. Note absence of crickets and birds.

Listen for man-made sounds, especially metal on metal, which are distinctive in the field. Similarly, protect yourself from this sound by taping all metal surfaces that may rub together.

Teach yourself the smells of the environment. Smell sap from recently cut tree branches. Smell soil from newly turned earth. Both of these smells can be evidence of enemy activity.

Cigarettes can be detected downwind at 500m. Smoky fires can be detected farther still. Fish, garlic and other foods being cooked can be smelled several hundred meters away.

Smoking cigarettes and cigarette second-hand smoke interferes with your ability to smell.

Soldiers can be smelled. The enemy smells different. Clothing absorb smoke and food odors. Enemy excrement smells different due to a different diet.

Common Errors
Ruining your sense of smell prior to mission. Do not smoke.
Smelling yourself or your own unit. Avoid scented soap, after-shave, and newly laundered cammies. Limit use of soap, shaving cream, toothpaste, and insect repellant. Bathing is NOT hygiene.

Topic

Filling Sandbags
Turn Inside Out
Cuffing the Bag
Packing
Tying

Setting in Sandbags

When you don't have sandbags

Fighting Positions: Cold Weather Considerations

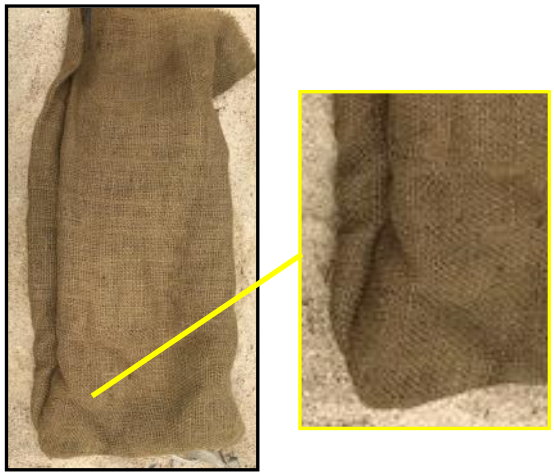
Filling Sandbags: Turn Inside Out

Sandbags often come with the stitching outboard (picture, below left). Structurally, sand bags are much weaker when filled with the 'stitching out'.

Turn the sand bags inside out (picture, below, right). With the stitching inside the sand bag, it is structurally stronger, able to hold more dirt, and withstands more rounds before exploding and loosing all its dirt.

Stitching inside out—Bad

Stitching right side in—Good



Filling Sandbags: Cuffing the Bag

There is a more efficient way to fill sandbags. Cuff the sandbag much like you would do with a shirt sleeve (picture, below left).

Set the sandbag on its end and scoop the first few shovels of dirt in (picture, below middle).

Once full, slam it on the ground to pack it. This makes the sandbag into a 'cup' that stays open. Once filled to the top, uncuff the sandbag a few times and continue to fill.

Fill sandbags until they are 3/4 full. Do not fill to the end of the sandbag.

Fill Sandbags: Packing

Sand and dirt stop bullets more efficiently when packed. After filling your sandbag, slam it quickly on the ground three times to pack the dirt (pictures, below). This packed sandbag will also be easier to set in.

Fill Sandbags: Tying

After filling and packing, sandbags need to be tied.

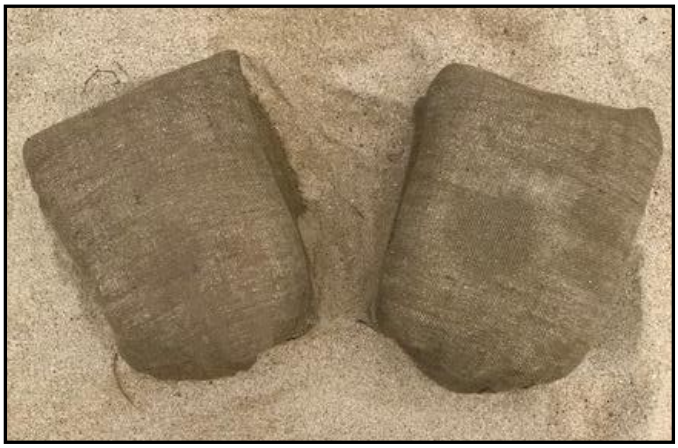
Grasp approximately 6” at the top to form a tail. Wrap the twine twice in opposite directions.

Tie with a bow-tie. This step is important. If you tie the twine with any other knot, it will be difficult to untie and salvage the sandbag if you need to move positions.

Setting in Sandbags

After filling, packing, and tying, set in your sandbags along your sector of fire. The 'bottom' of the sandbag faces the enemy. The 'tail' of the sandbag is tucked in underneath. This prevents sand and dirt from spilling out of the tail if it was tied poorly and allows you to use sand bags if there was no twine to tie the tail.

When emplacing sand bags, site them so as they align with the left and right lateral limits of your sector. The 'firing port' (the opening that you shoot from) should be small; part of the usefulness of sandbags is that they stop bullets. A wider firing port means you are more exposed to enemy fire.



Sandbag Substitutes

The vagaries of battle demand our imagination. Sandbags may not always be available. Any object that can hold packed earth, snow or rubble should be considered.

Ammo crates, MRE boxes, or ammo cans are all acceptable substitutes for sandbags. Imagination is more important than knowledge in this respect.

Fighting Positions: Cold Weather Considerations

Snow and ice can be used to construct fighting positions. Generally, there are three types of snow:
Wet Snow. Packs well and is easier to shape. Becomes stronger as it sets and freezes.
Dry Snow. Less suitable for fighting positions. Does not pack as well as wet snow. Takes a few hours to consolidate after packing.
Hard Pack Snow. Snow that has consolidated and is firm. Easy to shape.

"Ice-crete" is the preferred material for cold weather fighting positions. Ice-crete is a frozen mixture of soil, water, rock, gravel, sand and silt. Ice-crete is has similar properties to Portland cement, but will generally melt fast than hard packed snow. Melting can be delayed by covering ice-crete blocks with snow.

While snow can be dug and shaped with a shovel, the easiest method is to pack snow into a form. MRE boxes work well, and are readily available. It is recommended that you acquire 8-10 MRE boxes for this method. Fill MRE boxes with packed snow. Allow them to freeze; the time this takes may vary depending on the ambient air temperatures. After freezing, simply turn the MRE box upside down and slide the newly formed snow-block out. Emplace snow-block.

Snow Penetration Values for a single round of 7.62 NATO

Snow Type	Feet Needed
Newly Fallen Snow	13
Firmly Frozen	8-10
Packed Snow	6.5
Frozen Snow/Water Mix	4-5
Ice	3.25
Ice Crete	1

Do not use packed snow or ice alone. Reinforce your position with logs and other materials as they are available.

Topic

Important Calculations
WRM
Converting Degrees
Flash to Bang
Meter Conversion
Time/Space Calculation
Wind Speed
Time and Space Planning

Planning Factors
Naming Conventions

Important Calculations

WRM
Width equals Range multiplied by Mils OR
Range = Width/Mils X 1000

Converting Degrees
Degrees x 17.8 = mils
Converting Mils: Mils/17.8 = Degrees
1 mil = 1 meter @ 1000 meters

Flash to Bang
Elapsed time (seconds) between visible impact and sound arrival x 350 meters/second = distance

Meter Conversion
Meters x 3.28 = Feet MSL
Feet/3.28 = meters

Distance/Speed=Time (Seconds)
1. Calculate Total Distance to travel
2. Get planning constant from table below
3. Divide total distance by speed to get the time to travel that distance.

Calculating wind speed
Drop light object (grass, loose dirt, etc). Point at object. Estimate angle of your arm. Divide angle by 4. Answer is wind speed in knots.

Time and Space Planning Tool

Condition	Speed	Distance Per Minute
In Vehicles (convoy/tracks)	9.31 MPH/15 KPH	250 m
Dismounted Patrol/No enemy	4 MPH/6.43 KPH	107 m
Dismounted Patrol/Traveling Overwatch/Enemy Observation	2.5 MPH/2.41 KPH	67 m
Bounding Overwatch	1.5 MPH/2.41 KPH	40 m
Contact/Effective Fire	1 MPH/1.6 KPH	

Naming Conventions

Purpose. Standard naming conventions place events in a commander's mind, and allow them to mentally picture the battlefield quickly and without referencing a map. The Marine Corps has no definitive naming convention.

Assembly Areas. Assembly Areas are assigned a number. Example: AA2. Note: There is no such thing as a 'tactical assembly area'. All assembly areas are tactical control measures, and thus tactical by nature.

Phase Lines. Phase lines are colors. Example: PL Blue. Colors Red, Yellow, and Green are avoided.

Checkpoints. Check points are numbers. Example: CP13

Landing Zones. LZs are birds. Example: LZ Swallow. Hasty LZs are the colors black or silver. Example: HLZ Black. LZ's are associated by first letter to phase lines. Example: LZ Bluejay is near PL Blue.

Routes. Routes are named for states. The northern most route in an area is named after the northern-most state. Western-most route is named for the western-most state and so on. Example: Route California

Objectives. Battalion objectives are letters. Company objectives are numbers. Platoon objectives are numbers corresponding to the decade. Examples: Battalion Objective A. Company Objective 20 (Company Objective for second platoon), Company Objective 30 (Company objective for third platoon). Numbers within a decade correspond to the squad. Example: Platoon Objective 31 (third platoon, first squad).

TRPs. TRPs are numbers. Decades correspond with the platoon. Example: TRP 23 designates a TRP located in second platoon, third squad sector. Commanders designate TRPs.

Obstacles. Obstacles are a letter and a number. The letter corresponds with the obstacle's function, Blocking, Disrupting, Turning, or Fixing. Example, T02: Turning Obstacle 2.

Engagement Areas. EAs are named for large cats. Example: EA Puma.

Battle Positions. Battle positions are numbered by decade corresponding to the platoon. Example: BP 10 is first platoon's BP.

RW BP. Rotary Wing BPs are named for snakes or snake-like objects. Example: BP Rattler. When able, BPs correspond to the cardinal direction, relative to the enemy. Example: BP Winder is the western BP.

RW Holding Area. Holding areas are named for females. Generally, they correspond to the cardinal direction. Example: HA Sally is the southern HA.

FW IP. Initial Points are named for cars. Generally, they correspond to the cardinal direction. Example: IP Nissan is the northern IP.

ACA. ACAs are similar to routes and contain contact points. The northern most ACA in an area is named after the northern-most state. Western-most ACA is named for the western-most state and so on. Example: Route California. Contact points are named for cities within that state. Example: Contact Point Sacramento.

NAI. NAIs are named in decades. Decades correspond to platoons. Example: NAI 21 is second platoon, first squad. NAIs are made for larger units. Example: NAI B21 is B Co second platoon, first squad. NAI 3B21 is third battalion, company B, second platoon, first squad.

Trigger Lines. Traffic rules apply. TL Green and Yellow mean open fire. TL Red is associated with FPFs or FPLs.

Group. Target groups are alpha-numeric. They contain a letter-number-letter combination. Example: Group A1B

Topic

NVGs
Reading With NVGs: Flashcard/Index Card
Reading at Night: Blue light/highlighter
Notes on NVGs

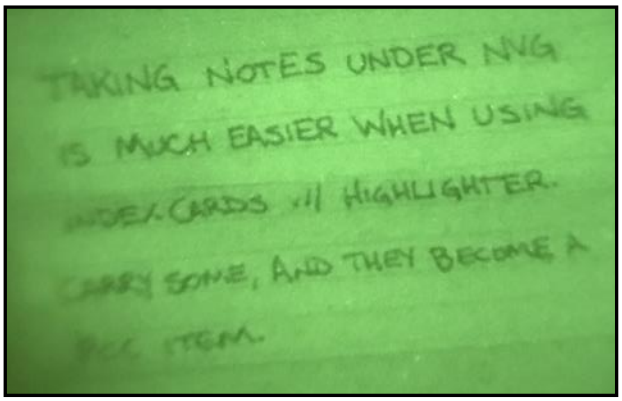
Batteries
Packing Batteries—Tape
Packing Batteries—Container

Notes on Counter UAS

CASEVAC
Manifesting Patients for CASEVAC
Cold Weather Considerations for CASEVAC
Your Ruck as a CASEVAC Platform

EPW and Detainee Handling
Flexicuff SOP
Hasty FIngerprinting

Reading With NVGs



Carry several 3x5 index cards colored in with yellow highlighter. It is much easier to take notes on them with just NVGs.

To read with NVGs:
Using the appropriate chart, calibrate NVGs prior to departure.

Focus ocular ring.

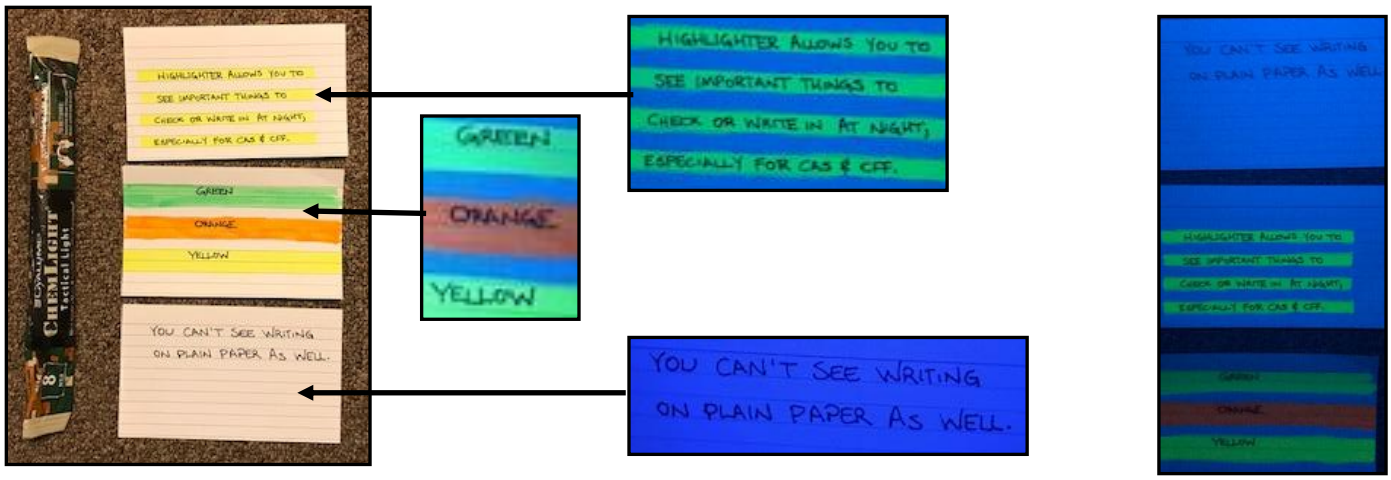
Focus objective lens. Depth of field is much more sensitive the closer you are.

Reading At Night

From time to time, it maybe necessary to read notes in the dark. A trick to seeing notes better is to use yellow highlighter and blue chemlight. Include highlighted index cards (or highlight important parts of formats such as call for fire) and a tape up blue chemlight (the tape helps with light emission) as part of your battle board kit.

Blue is the preferred color; other colors are too bright. Yellow is the preferred highlighter; other colors of highlighter are not as effective.

Blue chemlight taped to control light emission



Notes on NVGs

During the day, take your rhino mount off of your Kevlar! Leaving your rhino mount on risks damaging it during day operations. Stow your rhino mount in your NVG bag.

During PCC's attach your NVG elbow. Do it during the day, and stow it like that. That way, when it is time to mount NVGs, you are not struggling to attach it. Simply mount your rhino, and mount your NVGs.

You should be able to mount your NVGs in the dark with out taking off any gear.

In cold weather, keep NVGs outside of sleeping systems and tents. Taking NVGs between cold and warm environments cause unnecessary fogging of the optic.

NVGs. The concentration required to use NVGs reduces smelling ability. NVGs limit fields of view. Supplement NVGs with thermal optics.

Battery Bandoleer

Pack and carry batteries easily and quietly by this simple method.

Lay out two pieces of tape. Lay batteries tightly along tape.

Fold over top and bottom pieces of tape.

Fold the ends in like you are wrapping a present. Place in waterproof bag.

To access, strip or cut of one battery from the bandoleer.

Commercially available battery holders also work very well (picture, below left).

With battery bandoleers, an easy way to differentiate battery types is to tape AA is groups of two and AAA in groups of 3.

Notes on Counter UAS

The fact is enemy UAS will be a theme of any future conflict, and will grow more persistent. Currently, there is no consistent technology based solution. There is however, a growing list of field craft tips and field TTPs that Marines can use to mitigate of the risk of being spotted by UAS.

Route Selection Matters. Confine movements to shadows (as in the shadows of buildings) or the treeline. Electro-optical instruments currently have a difficult time seeing shadow, especially on bright sunny days.

When the possibility of EN UAS observation is high, move slow. Rapid movements are easier for drone operators to see. When alerted, Marines should halt if tactically feasible, and slowly get into a covered, prone position. Do not run. Prone signatures are difficult for EN-UAS to see, especially above 500 ft AGL.

Fighting positions must include overhead concealment or cover. Overhead concealment must include local vegetation. Ponchos and poncho liners are visible to EO and thermal optics. Tarps are shiny, and when warm, sag—creating noticeable shadow.

Thermal Crossover Matters. Thermal crossover is a period of time in the early morning and evening when the ambient air temperature is generally the same as the ground temperature. Operating at dusk and sunset—during thermal crossover— masks thermal signatures of Marines.

Conversely, EO cameras in EN UAS can easily see the long shadows cast during morning and evening. An average human can cast a shadow 12 feet long during morning or evening. Marines get into the prone to avoid detection, or pick routes that avoid direct sunlight during these times.

During MOUT, Marines must stay deeper in rooms with windows that don't have glass. Marines near windows are easily detectable by EN UAS thermal cameras.

Each area has a natural thermal signature. For example, in the desert, wadi and dried riverbeds tend to stay 'hotter' at night. Consider them for night movements. During night movements, consider keeping some form of concealment (poncho liner, ghillie blanket, etc) handy for a hasty counter-drone action.

Be aware of the sun; savvy EN UAS operators will follow your unit by masking EN UAS in the sun.

Shadows Matter. During thermal crossover, when the sun is low on the horizon, shadows can extend 17' or more (picture, right)

Manifesting Patients for CASEVAC

For the manifesting of patients boarding a CASEVAC, the standard reference is the ASTACSOP (2020).

The preferred method of manifesting casualties is a lined 5”x7” index card (kept in the LZ Kit). The unit’s APL fills out standard information:

Serial: this is the flight the casualty is leaving on. Unit numbering SOPs apply, but typically go in numerical order: 1001 is the first helicopter of the first lift. This is especially useful in situations where the unit conducts multiple CASEVACs or in the event of a mass casualty incident that requires multiple lifts. The next in sequence would be 1002, etc.

The unit leader makes two copies: one for themselves, and one for the flight crew.

Name: standard is last name, first name, middle initial
Blood Type
EDIPI: standard is last five
Weight (without gear)
Weight (with gear)
Special Equipment

See example at right.

Serial 1004

Name	B Type	EDIPI	Weight		Sp Equip
Smith, John C	O+	12345	200	140	None

Cold Weather Casualty Considerations

The cold presents unique considerations for casualty packaging and transport.

Even if the casualty does not present with hypothermia, treat them for it anyway. Always package casualties as if they were hypothermic. The loss of blood and hypovolemic shock will give the casualty the sensation of cold—often regardless of outside temperature.

Use any available means (mylar blanket, ISO mat, sleeping bag, poncho liner) to keep the casualty warm.

Even during routine, warm-environment CASEVACs, casualties can die from cold-injuries. Air CASEVACs, flying with their bay doors open, can cause casualties to die from hypothermia. ALWAYS package casualties as if they were hypothermic.

To package for transport:
1. Start with platform (skid preferred, but could include litter, poleless litter, or poncho)
2. ISO mat recommended. The 1/4 inch of foam reduces hypothermia.
3. Add warming layers (sleeping bag, mylar blanket, poncho liner).
4. Strap in. Always secure the casualty to the best of your ability. Do not leave loose limbs free.
5. Protect casualty. During air CASEVAC, high winds create dust, or ice crystals that could further injure a casualty. The aid and litter team shields the casualty with their bodies.

Your Ruck is a CASEVAC Platform

Your issued ruck sack can serve as a CASEVAC platform in a pinch.

Empty contents. Zip the internal compartment separator. Unzip the bottom external zipper .

Insert casualty's legs through the openings on each side of the separator.

Tighten Straps.

While this is not ideal for a variety of injuries, it can be used in emergencies to great effect.

EPW Flexicuff SOP

Each member of the squad keeps 'unzipped' flexicuffs woven into the MOLLE on the back of their flak.

Worn this way, one Marine can hold security while another Marine takes the flexicuffs out of the flak and assembles them.

The principle of security is never violated.

When flexicuffs are 'zipped' and held onto various buckles and clips in gear, they become brittle and get caught on vegetation—simply put, they get in the way.

Hasty Fingerprinting EPWs: Method 1

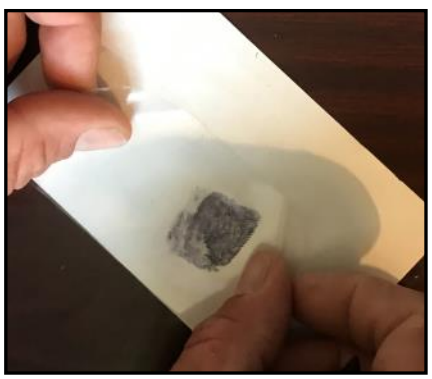
Fingerprinting kits may not always be available, and sometimes hasty methods are called for. There are two hasty methods of fingerprinting.

As part of an EPW kit, carry blank index cards, permanent market and clear tape (picture, right).

Using permanent marker, color individual fingers (below, left). Roll fingers onto index card (below, middle). Cover with clear tape and label appropriately (below, right).

Hasty Fingerprinting EPWs: Method 2

Using permanent marker, apply ink to the finger in the same way as Method 1. Roll finger directly on to the tape (picture below, left). Take the resulting finger print (picture, below middle) and apply directly to the index card (below, right).



Topic

LZ Kit
EPW Kit
TSE Kit
Combat Lifesaver Kit
Terrain Model Kit
After-Market Gear

LZ Kit

3x5 Notecards to make hasty Assault Support Serial Assignment Cards. Unit leaders make 1 for casualties, 1 for unit leader, 1 for MACO

Kestrel Wind Gauge

Firefly for IR Marking

Airpanel with stakes

Smoke and pyro, as issued

Signal mirror

Buzzsaw

5x Obstacle Marking

EPW Kit

Neck Gaitor or black out goggles

Index cards, clear tape for fingerprints

Pens

Pencils

Chemlights (orange/white clean dirty pit)

Flexicuffs

Forms, as required, to report chain of custody

Evidence bags (Ziploc or similar)

Tactical Site Exploitation Kit

Voice recorder

Index cards to record items found

Plastic bags, variety of sizes

Sharpies

Digital camera

Small notebook

Pen/Pencil

Combat Lifesaver

CLS bag, stocked

Poleless litter, 1 per squad. Old gasmask pouches are ideal for carrying poleless liters.

Poled litter, 1 per vehicle

Terrain Model Kit

“Tactical-style” hygiene kits work exceptionally well for units up to company size.

550 Cord guts wrapped around cardboard. Allows for easy organization of cordage.

Blue, black, red, green, white, and yellow yarn. For depiction of TCMs and terrain features. Spool yard in cardboard.

Laminated Ops graphics, blank laminated cards. Laminating helps with writing grids and other pertinent information on the card. Before laminating, punch holes in index cards.

50x Golf tees. This allows you to place TCMs and operational graphics on a terrain model and move as desired. Tape to laminated cards.

Duct tape, electirical tape as required.

Sharpies/all colors

Cardboard N arrow. Cut from MRE box. Spray paint yellow. Punch a hole in the center. This hole allows you to stake it into the ground, and ‘spin’ to north.

Cheap tent stakes

Beau Winn Philosophy. Never cut cordage. Yarn, 550 or other methods for depicting features should not be cut, but rather rolled at the edge of the terrain model. Cutting cordage makes that cordage useless.

A

After Market Gear

The following is a list of non-issued gear of importance to the Infantry Marine:

Field Jacket Liner
Jet Boil, rocket stove, or similar
Wristwatch
Durable folding knife
Change out the frame of your ruck for an ALICE frame. ALICE frames are more durable and bear load better.
NVG Counter-weight
Headlamp
SOF-T Tourniquet
Multi-Tool. Leatherman MUT recommended.

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Note: In addition to TMs and FMs, much of the mortar section was sourced from Corporal Blackard's experiences training with the Norwegian military during a combined exercise there.

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Chapter 13: Planning

Important Calculations

Infantry Unit Leader's Course Time and Space Planning Tool

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"THE MORE YOU KNOW, THE LESS YOU CARRY."