



SNIPER OPERATIONS MANUAL v2.0

The Sniper Operations Manual for Arma 2 covers all aspects of being a sniper or spotter in Arma 2. For both seasoned veterans and new players alike, The SOM is your go-to guide for definitions and techniques of sniper teams, explanations for all factors that challenge precise and accurate long-range shooting, and a collection of useful specs and tactical knowledge related to the sniper's craft. Moreover, this manual offers insight for leaders — or players who focus on other roles — to understand the way snipers think and operate in order to do their own job better; why when employed correctly, snipers are a vital extension for a team of any size. These chapters reveal how snipers are able to be leveraged in any mission and on any battlefield.

L A T R A N G & F E L I X L E G I O N
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P R E F A C E

Welcome to the Sniper Operations Manual for Arma 2. Known as “The SOM,” this manual was written in an effort to give current and aspiring snipers references needed to be true masters of their craft. We commend your effort in taking the first steps towards the challenge of studying and applying this information. We hope it ignites those players who constantly strive for improvement in themselves and in their team, who never stop learning, pushing their capabilities to the limit, and who never settle for average performance in categories such as bullets or lives wasted; we have done so ourselves in the writing of this.

The Arma series affords us military enthusiasts the luxury of treating the game as realistic as we want to make it. We have tried to cover every angle possible and take it a level above where most would dare to go. With this goal in mind, it was something we wanted to achieve while remembering to develop it with a most fitting realistic tone. In doing so, we end up with something that can be picked up and applied by practically anyone. Another note we take time to introduce is about the fine dance that has to be between what is technically right in the real world and what is appropriate to implement in the game. We think we achieved a careful balance between the two, and hope that everyone finds something useful to benefit their game wherever you come from or hope to go. The fact is that those who put in the time to learn and practice this material will get the most out of it. After all, to be called a sniper takes more than just picking up a long-barreled rifle and shooting things at long range.

Marksman vs. Sniper

There are two kinds of ranged shooters: the marksman and the sniper. Let’s focus on the differences and take the opportunity to set the record straight in a holistic sense. A marksman, though adept at hitting his targets with extreme accuracy, naturally lacks the overall field awareness due to operating, in our opinion, up to 800m and at ranges that vary frequently; not an easy task in its own light. Meanwhile, a sniper has the advantage of agility: able to assemble and deploy quickly (usually undetected) with minimal logistical planning and resources. On the ground, they are capable of acting independently and maneuvering seamlessly whereas a marksman’s duty must be to his squad first. The recon and intelligence gathering that a sniper team is in the best position to achieve can empower field leaders with advanced information to aid in the coordination of their forces against enemy’s plans far beyond their view. Under normal circumstances the differences between a marksman and sniper should be well understood so the lines are never blurred; rather, to ensure both are utilized to their fullest. Only then, when all cylinders are operating smoothly and every man is covering his role, do we find the entire team becomes stronger than the sum of its individuals. Both roles are central in that they extend the range of the unit lower to their own: the marksman as part of a squad over their fire teams; and a sniper team as part of a platoon over their squads. Two very important roles, neither considered better. But, for fear of drifting off the target already, this manual is for the Arma *SNIPER!*

What makes a good sniper?

A good sniper must be a team player, period. It's a defeatist approach for you to — in light of your *team's objective* — not be a *team player*. Yes, this may mean that a long-range rifle is not necessary or even wanted. What is more, not every player can play a “sniper” too; this also could lead to a self-prescribed defeat and mission failure. All too often in gaming there is a preconceived notation that a sniper is simply a lone wolf out there just getting kills selfishly. To those players we do not respectfully award the title of a sniper. We would say that their playing is not complimentary to their team or they are in the wrong game mode ...besides, if it did work with such success, everyone would surely gravitate to being a sniper. But, you'll find that the very nature of any battle prohibits this from being worth it even in a Team Deathmatch (TDM) game mode. Maybe you've even experienced this while on either the losing or (hopefully) winning side. How can a sniper cover so many other snipers! Even the pawns in chess become formidable wall, making it difficult for your opponent to maneuver. The sole purpose of a sniper is to be an asset to his team by providing them fluid battlefield intelligence and threaten the opposition through the application of surgical precision fire in the right place and at the right time. Due to the variety of missions a sniper can be called upon to perform, they absolutely must be able to improvise, adapt, and overcome. This is because in the same regard as any special operations unit, a sniper's job quite often requires a heightened level of dependency, which falls only on him. They must be able to improvise to maintain the advantage, adapt to the dynamics of a battlefield, and overcome the adversities that threaten their effectiveness. A sniper continually assesses their situation during combat and reviews their performance after deployment, using that knowledge to hone their skills and abilities. He is fully aware that the variables against him are unrelenting and always trying to become unpredictable. True ghosts of the battlefield, snipers are neither seen nor heard until the precise time they choose to make themselves known.

Logistics

All of the data given should be verified personally. To debate over its accuracy is wasted breath as we do not even for a second claim to have all the answers. Hours upon hours of extensive research and testing was done to construct the ballistic range data featured in Appendix 2A. The tests were designed to eliminate many of the variables that plague collecting standardized, reliable, and reproducible data in-game. Also, understand that game updates and engine changes down the road could potentially require new testing be performed and our values revised. With no single source of published or verified information regarding to the processing or physics driving the game, we only have math, practical trial and error, and the rigors of our own testing and experience to draw on. This is especially true for data that holds no predictable path and must be averaged for the sake of even being able to apply it. We are open to — and humbled by — suggestions and corrections alike. We cheerfully invite you to join in on the same fun we had applying ourselves to the challenges in discovering the deeper elements of this game. We hope the information contained herein might aid and educate players around the world in their own goals to develop greater skills, improve their teamwork, and invest in the virtual rewards associated with mastering these things. For example, in your objectives or during missions,

try creating your own personal range cards, notes, or drawings to reference during field operations. You'll find that it won't take much to be more prepared and therefore advance your how effective your contributions to the fight become. Train with tactics that work for you and your team to execute a flawless overwatch, command fire, or hot extraction. After all, those striving to be sharpshooters in real life assume these responsibilities because they realize it pays off.

We would like to state that the male-oriented language used in this manual is due solely to the subject matter applying to a specific role in-game that happens to feature no female characters. Any bias views are imagined and unintentional. The neat thing about our virtual worlds, is that those who play come from all walks of life, and do so under a shared, unified title: Gamer.

Lastly, we really hope you enjoy reading and *interacting* with this guide as much as we have enjoyed writing, playing, and sharing during the experience of developing it.

- LATRANG

- FELIXLEGION

GLOSSARY

The following list of acronyms is to aid in your reading and application. Some terms we reference directly in the SOM, while others we've included just to be helpful. You'll no doubt hear these while playing within your gaming community and/or in multiplayer servers.

"Comms" - Communications

AO - Area of Operations

FOB - Forward Operating Base

FARP - Forward Arming Refueling Point

LZ - Landing Zone

HVT - High Value Target

ETA - Estimated Time of Arrival

HALO - High Altitude, Low Opening

AOA - Avenue of Approach

RP - Release Point

FP - Firing Position

AP - Alternate Position

EP - Egress Point

OP - Observation Post

NV - Night Vision

TWS - Thermal Weapon Sight

QRF - Quick Reaction Force

SAR - Search and Rescue

ROE - Rules of Engagement

EOD - Explosive Ordnance Disposal

SEO - Sniper Employment Officer

FAC - Forward Air Controller

GPS - Global Positioning System

POA - Point of Aim

LOS - Line of Sight

SOP - Standard Operating Procedure

CAS - Close Air Support

NFA - No Fire Area

RTB - Return To Base

MSR - Main Supply Route

ASR - Auxiliary Supply Route

AT - Anti-Tank

AA or AAA - Anti-Air

HEAT - High Explosive Anti-Tank

HEDP - High Explosive Dual Purpose

JDAM - Joint Direct Attack Munition

CCP - Casualty Collection Point

CQB/CQC - Close Quarters Battle/Close Quarters Combat (*used interchangeably*)

SNIPER TEAM OVERVIEW

CHAPTER 1

The sniper team's organization is simple and consists of two positions: a shooter and a spotter. Do not let the wording fool you — both are trained shooters, referred to as snipers, and in most cases have a relationship that functions interchangeably and always complimentary. There are certain situations when a sniper might have to operate alone with no spotter, and subsequently must take on both duties. However, operating in a two-man team gives the greatest flexibility and lethality on the field for a mission. For this reason, they should primarily operate in a team of their own, positioned as an extension of a platoon or similar level. During insertion or extraction, the sniper can be attached to a "security team" the size of a squad or fire team. For the team to survive successfully they must move, act, and communicate as a single entity. Think of the sniper team like an attack helicopter crew: the spotter is the pilot at the controls in charge of driving the mission, while the shooter acts as the gunner managing the weapon system.

SHOOTER RESPONSIBILITIES:

- Maintains constant observation on the AO and relays information with spotter
- Prepares range cards and takes notes about key landmarks or terrain features
- Actively scans for, identifies, and notes targets by priority
- Adjusts sniper weapon system and proactively controls breath for ranges of targets
- Engages targets in priority and as orchestrated by the spotter

SPOTTER RESPONSIBILITIES:

- Selects a FP, AP, and plans all egress routes in accordance with the mission
- Establishes the "Clock" and any sector splits (Chapter 6)
- Actively scans for, identifies, and notes targets by priority
- Provides specific calls with range estimates or other conditions such as wind
- Communications: to relay intel with leaders and coordinate with other teams
- Provides close-range security and takes point while moving

The sniper team's role is two-fold: First and foremost, they are shooters capable of delivering deliberate, long-range fire out to 800 meters and beyond with the precision of a surgeon and enough impact to cause disarray in any enemy force before they know what hit them. A sniper's motto, "one shot one kill", is a deep-rooted mentality that shapes the way they pick their fights and how they conduct themselves as well-disciplined, analytical types who consistently strive for perfection. Secondly, what some may argue is as important as the first, is surveillance and intelligence reporting. Knowing the layout and movement of enemy forces is a critical necessity in order to construct any plan. The sniper team is at the forefront of tackling this responsibility. With a low profile and extended operating range unmatched by any other role or vehicle, a sniper is a deadly presence even

when they are not pulling the trigger. It is important for all roles to understand and respect that the battlefield is an active and changing landscape and a sniper is vital to field leaders relaying this information as it develops.

SNIPER TEAM EQUIPMENT

In Arma 2, there are a vast number of weapons to choose from, most with some type of optical enhancement. In most cases, a sniper will carry a scope-equipped weapon over a holographic or red dot sight as these types will not give the sniper the magnification to hit targets accurately at a distance. However, any rifle in the hands of a trained sniper is a lethal combination. It boils down to what is required of your mission. There is no standard kit for a sniper or spotter; you should expect to adjust your load specifically for each mission.

It is encouraged for a sniper to familiarize himself with weapons of all types. When your primary weapon runs dry, you could be forced to pick up weapons or equipment off enemy soldiers or possibly you will find yourself with only your pistol; many different situations can happen. You must also know your limitations with your weapons. For example, some weapons are equipped with a TWS sight. This scope is designed to pick up heat signatures, which work very well for picking out enemies on the battlefield at night or even during the day; however, the clarity is reduced hampering the sniper's ability to identify targets clearly. What is more, engaging at extreme long-range targets becomes near impossible without the right reference marks on your reticle; there are trade-offs for every decision. If you choose a weapon with a sight like this when you know you will be relied upon to consistently engage targets at 1200m is a poor choice. Be aware of the limitations of each weapon and be able to handle it most effectively. In order to do that, you will need to expand your skill set with them all.

There are numerous types of weapons and equipment a sniper can use to accomplish their given mission. It is up to the sniper team to select which weapons will best fit their situation and to coordinate amongst themselves who will be taking what; each should know exactly who is carrying what before they deploy to the AO. This will cut down on radio chatter later with questions like: "Do you have this?" or "How many are you carrying of that?" A sniper team should already know all equipment and/or support that will be available to them in the field. Some tools-of-the-trade common in either a sniper or spotter's gear are as follows:

- **Smoke Grenades:** These are handy when you need to call out your position to friendly forces, air or land, and come in many different flavors. In addition, smoke is primarily used to screen the enemy from an injured friendly unit or if you must egress under fire. It can also help when you want to mark enemy locations the good old fashion way.
- **Grenades:** Fragmentation grenades work best when thrown at a group of soldiers to open an ambush or escape. These can also aid in clearing interior rooms or rooftops of buildings.

- **Satchel Charges:** All-purpose demolition charges. They work to take out certain objectives, sabotage enemy supplies and emplacements, and could be a last resort of defense for stealthy approaches on armored targets or launch a surprise ambush. Satchels can either be timed or remotely detonated up to 300m away and even while sitting inside a vehicle.
- **Binoculars:** A basic piece of optical equipment, binoculars are most useful when scanning vast areas quickly. They give the user a wide field of view, much larger than that of the Rangefinder, which we will cover later in the manual, but do not provide digital feedback for ranging distances. For ranging and observing or “glassing” an area, we recommend using the Laser Designator over the Rangefinder because it offers thermal capabilities as well as increased character mobility/tunnel-vision avoidance.
- **Laser Designator:** Snipers are the eyes and ears of the battlefield. Therefore, when a FAC (Forward Air Controller) is not available for indirect fire or air support to rely on, it may be necessary for a sniper to carry the Laser Designator to direct friendly support. **NOTE:** Don’t forget to carry the right battery or the laser feature will not work.



Screenshot by Jon Hillenbrand | jonhillenbrand.com
 Source: <http://www.flickr.com/photos/jonhillenbrand/4805397350>

SNIPER SYSTEMS

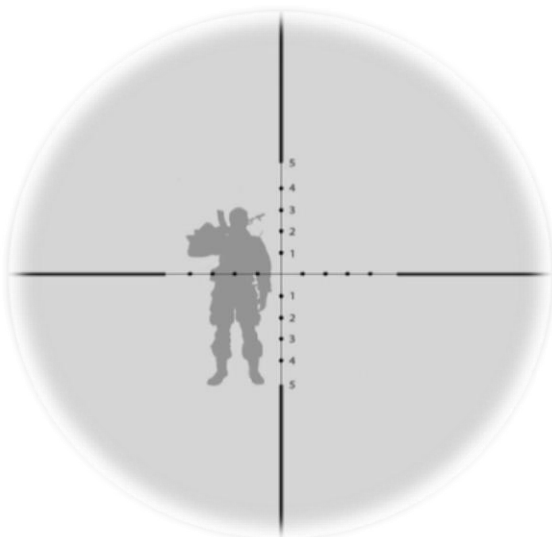
In Arma 2, there are several newer sniper rifles and some older-styled ones. What is more, some assault-type weapons with TWS or NV optics can be carried as a secondary weapon giving the sniper even greater flexibility. You can explore the specific capabilities for each weapon by studying the weapon comparison table and range charts provided in Appendix 1A and 2A, respectively. Data such as the max effective range, max zero adjustment, available optics, ammo type, and velocity of weapons in the game are in those tools for you.

USING A SNIPER SCOPE

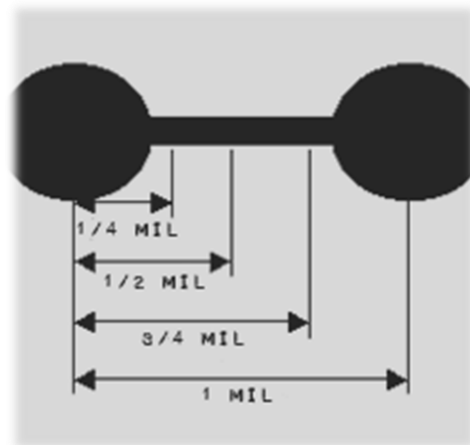
CHAPTER 2

MIL-DOT RETICLE

The mil-dot reticle is the standard for most of the sniper rifles in Arma 2. Mil-dots are a versatile tool in the sniper's arsenal and are used as references to gain precise adjustments when shooting in between or past a rifle's zeroing range. For example, the reticle below has 10 mil-dots from top to bottom, and counting the thick horizontal and vertical lines. Be aware, though, each rifle has its own "mil-distance" and is different in the way it acts resulting in unique hold over adjustments that must be learned. Head to Appendix 2A at the end of this manual for all the data you need to adjust for holdovers various ranges. There are a variety of websites that offer history and explanations of how to read mil-dots on a scope. While range-finding can simply be done with just a formula and a mil-dot reticle, we cannot assume that the dots graphically represented in Arma 2 are geometrically accurate, nor can we determine if they are standard Army or USMC mil-dots ...yes there are two different types. It is because of this we cannot reliably use mil-dots to range targets in-game like you can in real life. With that said, for the purposes of referencing your shots in Arma 2, the most important aspect to understand is that the generic distance between the mil-dots translate to one mil. Furthermore, the distance between the centers of the dots can be visually broken down to fractions such as a 1/2 or even 1/3 mil, equating to half the distance or one third of the distance from the center of one dot to the next dot, respectively.



A mil-dot reticle

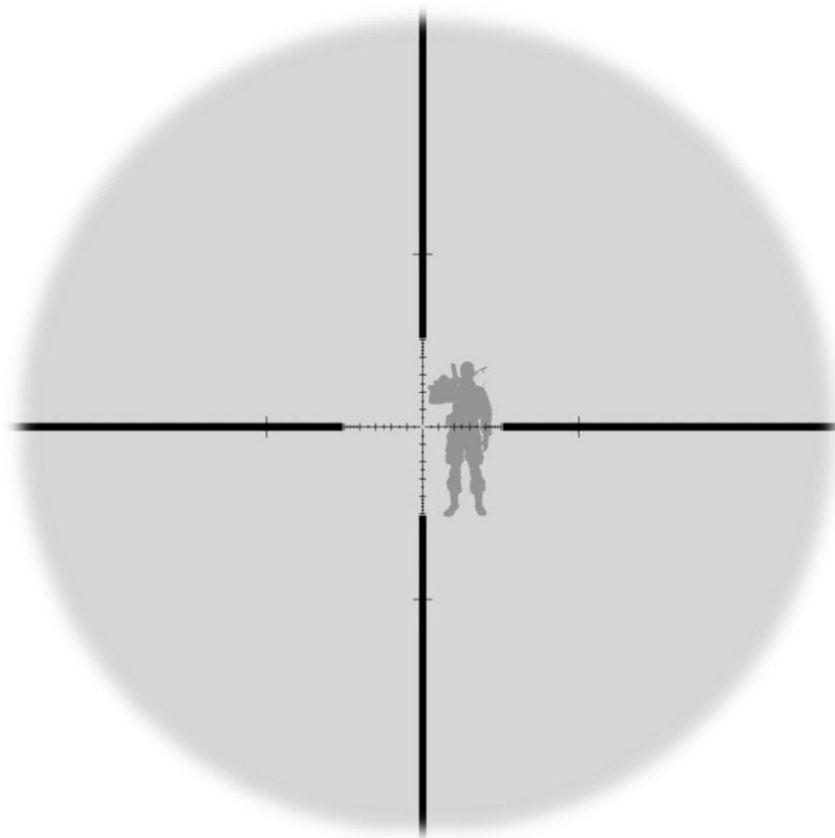


Reading mil-dots and their fractions

TIP: More history and details about mil-dots can be found around the internet with a few quick searches; though we have provide all you need to know in this manual. Much of the rest of this manual assumes you have a basic understanding of these fundamentals. To use the range charts we have provided in Appendix 2A, you simply need to know how to read and apply mil-dots in-game to find success. Again, in our Arma experience, trying to translat mil-dots into a distance such as meters, is an unreliable practice that cannot easily be quantified or derived as it can in real life.

P4 RETICLE

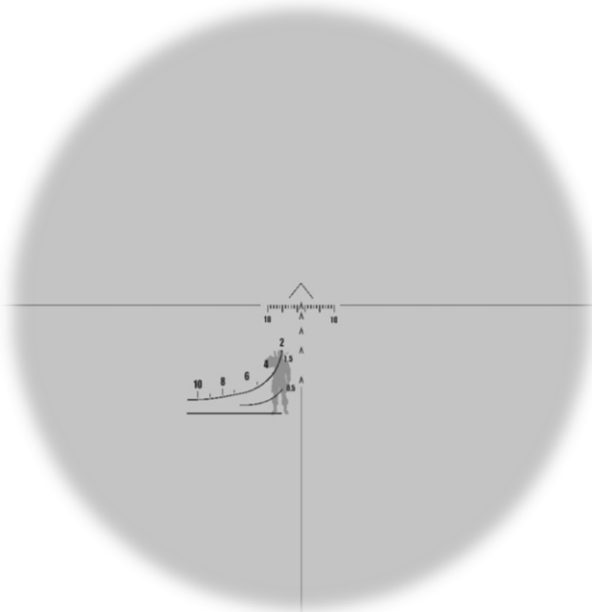
The Mk17 Sniper variant does not use a mil-dot reticle for aiming, but instead has what is referred to as a P4 type scope; it has tick marks instead of mil-dots. This scope is used the same way to adjust zero range using the same keys, but you will have to grow familiar with the distance of each. You will notice it has many more hash marks in the scope when compared to the mil-dot reticle, which is helpful to fine-tune your holdover.



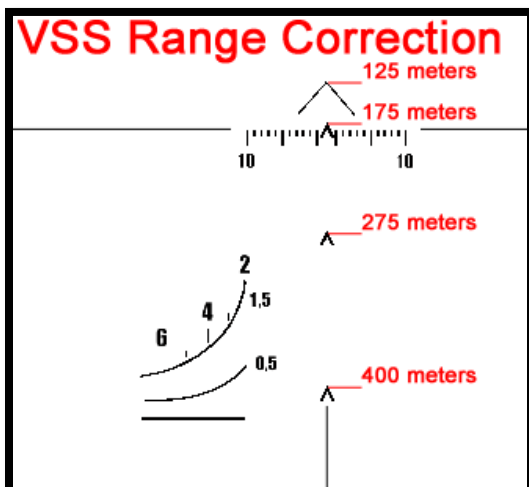
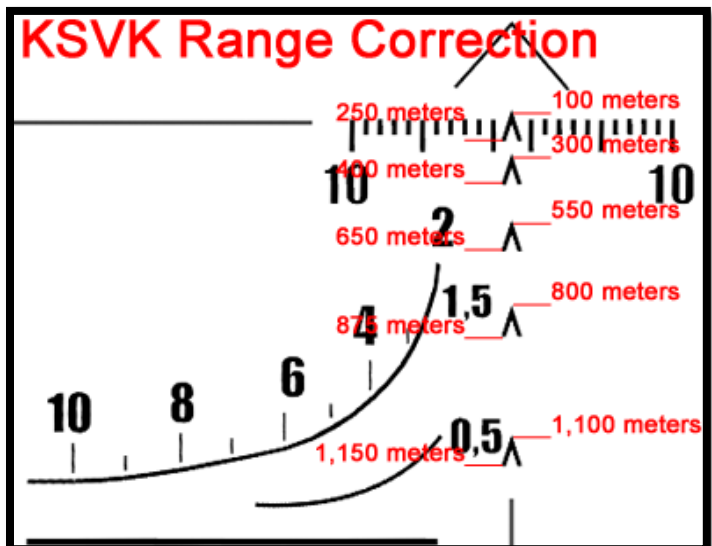
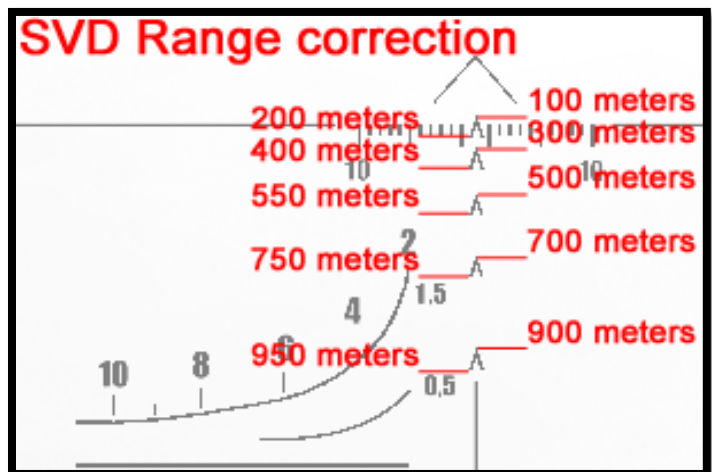
A P4 reticle

PSO-1

The SVD and KSVK rifles share the same PSO-1 type reticle. This type is unique in the fact that you are unable to adjust your zero with these weapons. They do have a built-in range estimator: an added function of this style reticle. By simply fitting the height of your target within the sloped lines, you can approximate the range. The "1,5" next to the line means the slope of the range finding reticle is calibrated for a target 1.5 meters (5 feet) tall or the average size of a person; this means the "0,5" sloped lines are employed to range targets which stand 0.5 meters (20 inches). Since there is no elevation adjustment or zeroing capability with this scope type, you must use the chevron (^) shapes which are aligned vertically as the POA to adjust for ranges. This reticle has been around for a long time. After a considerable amount of training and experience, it will become a fun challenge to use and the benefit of range-finding without leaving the scope can be realized. The range correction images below (created by player: "Daniel_Malloy") will help you to understand how to *read* the PSO-1 reticle at the very least. **NOTE:** The range charts we provide in Appendix 2A offer a full and more precise spectrum of holdover values for shooting PSO-1 scope-mounted sniper systems.



A PSO-1 reticle



NIGHT VISION (NV)

There are several night vision capable sniper systems available in Arma 2. Certain variations of the SVD and other assault rifles do have this capability. However, the M110 and VSS are the most versatile because their optics have the ability to switch from day to night vision. You can switch between the two modes by using the default <N> key while looking through the scope, the same key used to activate your night vision goggles of course.



View as seen through a night vision enabled mil-dot scope

THERMAL WEAPON SYSTEM (TWS)

The Thermal Weapon System optic, simply referred to as TWS, adds a new layer of dimension to a sniper's arsenal. A rifle equipped with TWS can see through both day and night equally well. It picks up thermal signatures so you do not keep the clarity as you would in some of the other sniper optics, but you benefit from decreased target acquisition time. With a TWS optic, you get two different styles: "White Hot" or "Black Hot" and you can switch between the two by using the default <N> key; neither view is particularly better than the other, and both can help you acquire targets extremely quickly especially over a vast territory. The sniper should use extra caution to identify friendly forces vs. enemy targets when using TWS optics. *Friendly fire is unacceptable under any condition.*



A TWS optic offers two display modes: "White Hot" (at top) and "Black Hot" (at bottom)



NAVIGATION AND MOVEMENT

CHAPTER 3

The key weapon in the hands of any sniper is perhaps a keen ability to stay hidden; this is in fact essential to how they fight and survive. Snipers achieve a stealthy presence by maintaining a low profile and employing camouflage techniques. Although, knowing how to get in and out is the first order of business. Understanding the importance of how to move to and from your objectives as well as how to stalk targets will scale up the effectiveness of your presence on the battlefield. This chapter features methods and tactics useful to the sniper to their partner as your team moves from location to location, accomplishing varying objectives. We begin by discussing the procedures of navigation and map reading, crucial skills in advancing your plans and knowledge of the area before deploying.

MAP READING

The map in is your primary intelligence when it comes to directions, elevations, coordinates, and terrain shapes. Wherever you might be operating, it is vital you have a grasp on how to bring up the map and GPS by using the keys: <M> or <CTRL+R> by default respectively. Knowing how to read and interact with this basic tool, and not just looking at it, is compulsory to the success of you and your team. For the player taking on the role of spotter, the map is accessed often, especially to evaluate locations prior to moving and to identify targets before engaging. Depending on the game's mission settings, the map also serves to update you (nearly real-time) on the maneuvers of friendly and/or enemy forces.

The elements of the map most relevant to the mission of a sniper include:

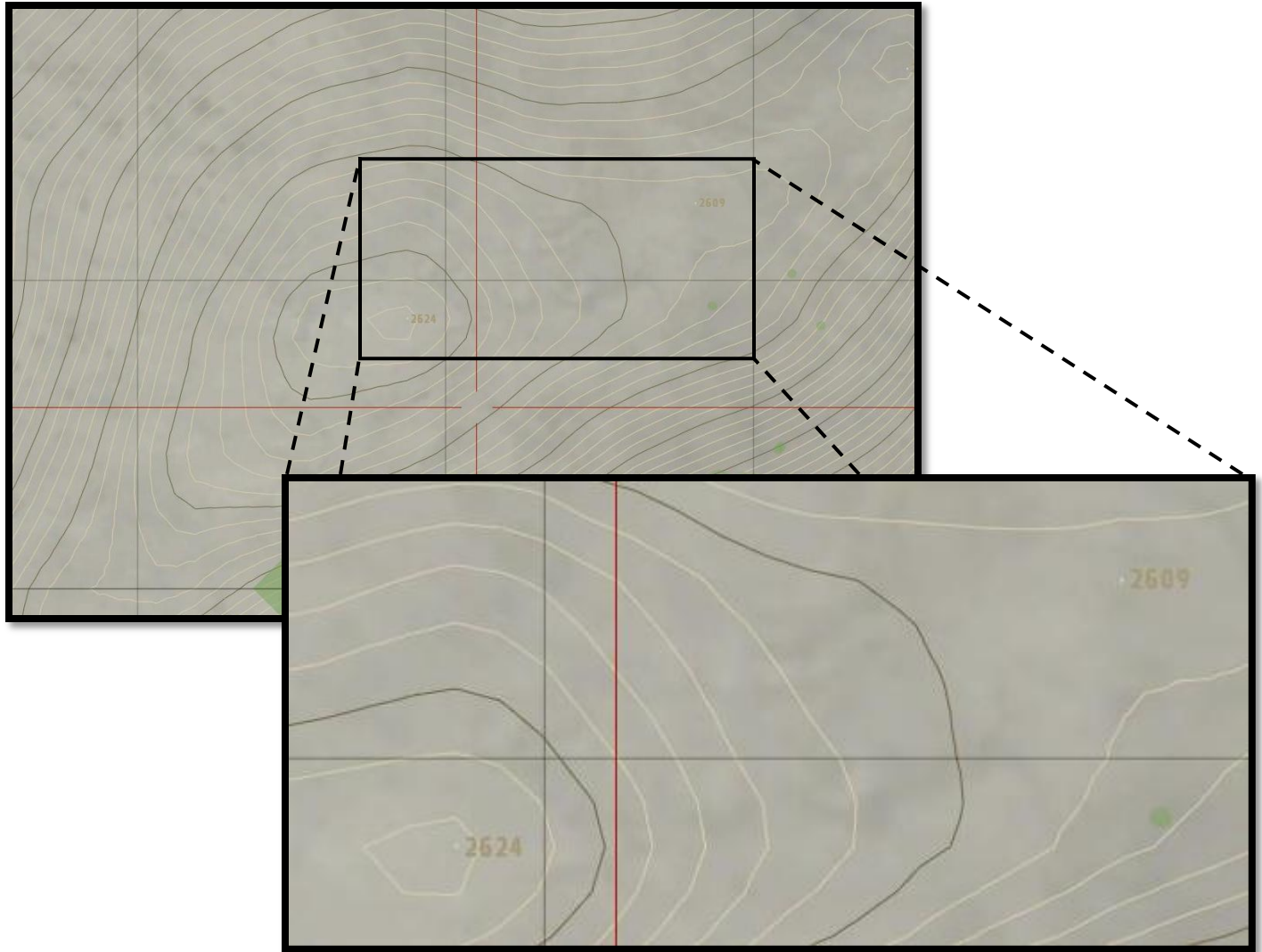
- Elevation
- Topographical Lines
- Grid Distance and Coordinates
- Markers
- Compass
- Symbols and Terrain Features

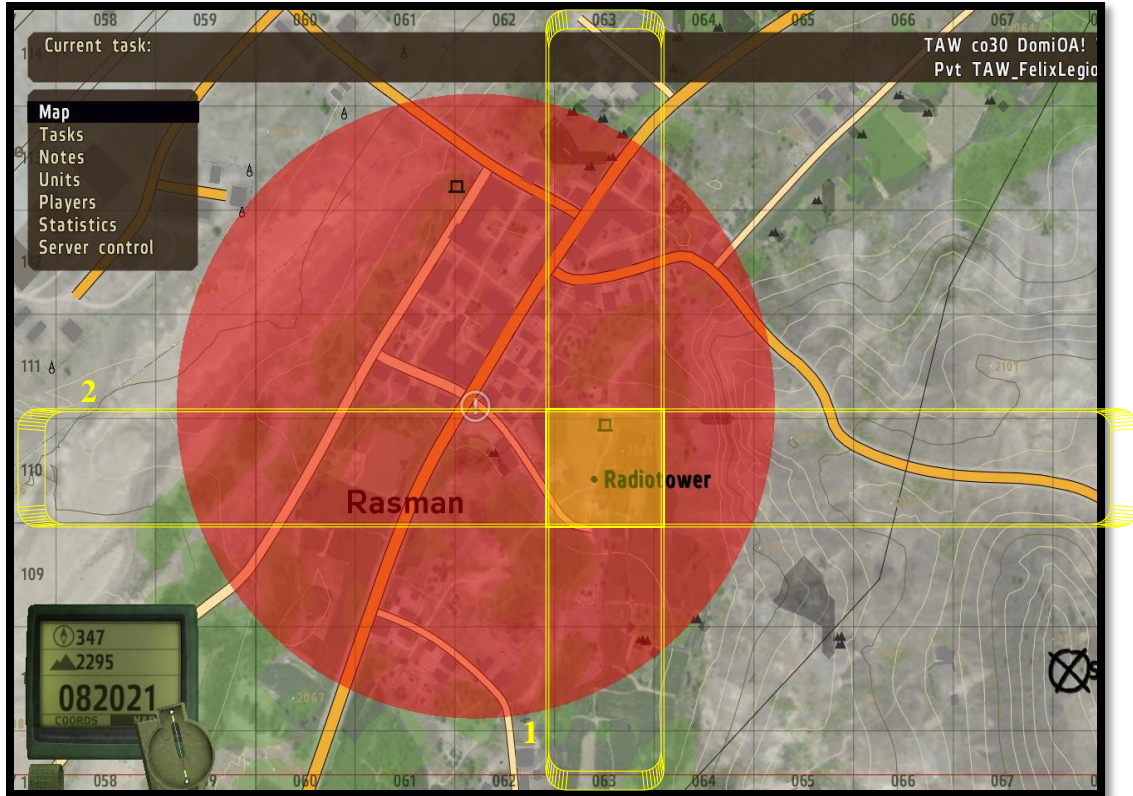


Elevation, or the height of the terrain, is designated by 4 tan-colored numbers. The elevation displayed will vary depending on the zoom of the map. With this in mind, it is important to zoom all amounts inside and outside of your AO so you do not miss any mission-critical land features. At the map's center below, you will find the elevation of this mountain is 2624m, and that the landform gently slopes down to an elevation of 2609m to the Northeast.

An example of *topographical lines* is below, and may be a feature you are already familiar with reading; these are the lines that flow across your map, mold themselves around mountains, and bring the terrain to life with more than just forests, buildings, and

roads. These lines can be thought of as a 2D depiction of a 3D surface. All of these things may seem second nature to you, but the contour and cover of your Firing Position (FP) — and those available to your enemy — should never be overlooked. Not knowing if there is a higher mountain in front of you will likely add more time to getting your team in position and on scope over your fire sector. Reading the topographical lines on a map and the various terrain features they reveal will aid you in identifying a natural AOA your enemy is likely to use. We'll go into more detail on symbols and terrain features as seen in Arma 2's topography map of in a couple pages.





Shown in the map above is an active AO, shaded in red. At the more functional levels of zoom, as you close in, fine grey lines will appear in grid fashion. The distance of each grid box is 100m by 100m and approximately 141m diagonally. This *grid distance* can be utilized as a scale to measure your range to the AO. On the outside of the map are grey numbers. By using the standard X, Y convention (X axis number, then Y axis number), *coordinates* can locate each grid on the map. For example, the radiotower lies at (063, 110) and is about 450m from the marker. **TIP:** To remember the correct order to refer coordinates, think about getting it right and then using what is left. *Read the grid numbers to the right along the bottom, then up the left side.*



















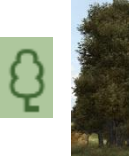


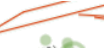
The coordinate system is definitive but not very quick or efficient. Therefore it is our recommendation that the system shouldn't be relied upon for continuous navigation. Coordinates may best serve as areas to guide artillery or CAS on a target, but the time it may take for your listener to translate 6 numbers to a position on the map can be done faster using *markers*. Markers can be placed on the map by double-clicking the point and can have any text input beside it. During this "text input mode" you can use the <UP> and <DOWN> arrow keys to cycle through all available marker shapes. Holding <SHIFT+UP / DOWN> changes the color. Choose the shape and color that's most appropriate for the marker or in line with the standards set by your team.


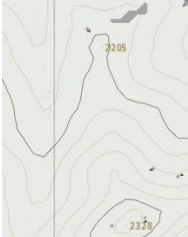
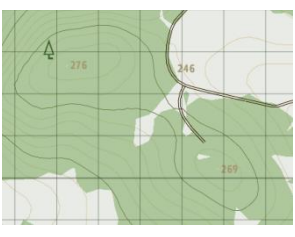

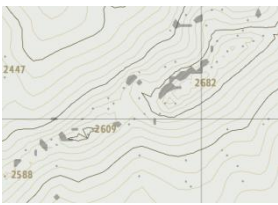
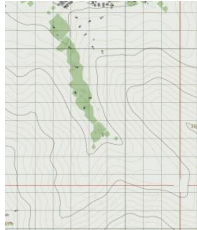

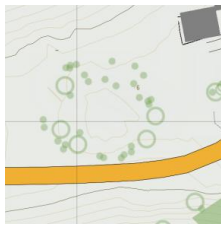
When a target is in an obscure medium or long-range direction, the *compass* is your best choice. Activated by the default key <K> and 2x <K> to toggle, it has 360 degrees to provide an immediate bearing to your teammates.



SYMBOLS AND TERRAIN FEATURES

In order to effectively plan a mission where you're going to be traveling along waypoints or inserting into an objective, a sniper team must understand how to read the *symbols* and *terrain features* on a map beyond just shapes and colors. Below are tables with symbols and terrain features as they look in Arma 2. Study and these to make the most of your routes, and FP selection, and efficient comms when describing areas on the map.

 Guard Tower	 Church	 Fence (brown)	 Bushes
 Water Tower	 Fountain	 High Wall (grey)	 Trees
 Radio Tower	 Port/Dock	 Low Wall(s)	 Pine Forest (higher foliage)
 Smokestack	 Fuel Station	 Oil Pipe	
 Lighthouse	 Rocks	 Oil Pipe Rack	 Broadleaf Forest (lower foliage)
 Castle	 Mountain	 Railroad	

 Hill	 Finger	 Saddle	 Cliff
 Ridge	 Draw	 Valley	 Depression

MOVEMENT AND STALKING

This section focuses on the stances your player can use to move and how they can be employed for various situations; these are the Standing Run, Standing Sprint, Crouch Run, and Crawling. The speed and profile of each posture are key factors we have evaluated here. Included below each one is a comms reference or “*speed*” in case you find it useful to standardize the pace of the team in your dialogue. An important note to add is that by double tapping the default <LEFT SHIFT> key, you can activate a slow “locked” version of the standing, crouching, and prone stances that prove great for stalking with controlled speed and minimal weapon sway while standing.



Standing Sprint – “*Fast*”

Sprinting is the fastest bipedal mode and is performed (default) by double-tapping the <W> key. Due to its inherent nature to physically tire your character whereby affecting your breathing, it is only advisable in a non-threat area or when you need to egress quickly out of fire at the expense of your concealment. Your profile can be spotted easily when sprinting, but you do not necessarily make yourself an easy target. When sprinting, do not expect to quickly hit medium- to long-range targets with any accuracy immediately after you’ve stopped.

TIP: In CQB scenarios, toggle your character into the slow locked mode and press the sprint key in short intermittent bursts to flank and gain angles quickly on targets, while moving from cover to cover. Utilizing this feature allows you to return to a steady, ready-to-fire stance fast without hitting another key. Watch the negative effect on your breathing, though.



Standing Run – “Medium”

The standing run is performed by holding down the <W> key and offers the fastest way to move without getting too out of breath. The profile of this stance in conjunction with the predictable speed does not offer much safety if you were to encounter enemy fire, however.



Crouched Run – “Slow”

A crouched run is performed the same as the normal run by holding the <W> key, but while in the crouched stance. This is the best way to move with decent speed and because it does not affect your breathing if you stumble upon an enemy, you can easily drop to a knee or go prone and engage with precision. From this position, when holding the key to sprint, you immediately enter into a standing sprint, a convenient speed increase to throttle as you see fit.



Crawl – “Crawl”

The crawl should be employed when you cannot afford to have a tall profile. For instance, this stance is best used when taking cover behind low walls/rocks, or to avoid being silhouetted or “skylined” against the horizon on the crest of a hill.

Now clearly this method causes your character to move the slowest, but looking beyond the obviousness of this fact there are two things to note. First, this posture allows you to snap very quickly into a steady shooting position to maintain your greatest accuracy for long-range engagements. Secondly, it means that should you come under fire from the front, you have made yourself a very small target to hit. The difference between being crouched and prone is very evident when under fire. Crawling severely minimizes the chance of the enemy spotting your movements; however, crawling leaves you slow and vulnerable to artillery and aggressive flanking. Even the crawl can be “locked” into the slow mode giving your stalking approach as much stealth as possible.







BASIC SNIPER MARKSMANSHIP

CHAPTER 4

One of the core competencies of a sniper must not only be shooting with great accuracy and precision. Controlling the factors that enable you to do this is a superior skill. These factors generally include personal concerns like patience and discipline. A sniper must have a strong knowledge of his perspective and situation, far beyond just what he sees through the scope. The formula for great marksmanship skills lies first in managing your stance and breathing pattern and then applying the knowledge of what you read through the scope.

STANCES AND BREATHING CONTROL

The sniper utilizes all stances depending on the situation. A sniper is sometimes required to move fast and other times at an extreme crawl. And after all this takes place, you are expected to retain your ability to shoot well — you can't determine when you have to be ready. In this way, it is important to have control over the things that affect you and the patience to know the limits of what is possible. It's pretty obvious knowledge: Just as your stance affects how you move, each stance has pros and cons in the results of shooting. Much of this will come across as common sense, but a brief visual comparison helps the pattern become second nature as the effects magnify over distance. The table we have provided below features a graphical estimate of the amount your reticle moves or sways while in different stances and breathing. As is figured, the prone position maintains a near-perfect still reticle with your breath held. **NOTE:** The steadiness offered by a lower stance can be achieved by holding your breath in a higher stance. This illustrates the shear importance of breathing control rather than solely relying on your stance.

	Standing	Crouching	Prone
<i>w/o Holding Breath</i>			
Holding Breath			

Here are some short notes and stats on your character's breathing in the game. Being aware of these at all times will let you maintain control of what the game is processing and also allow you to exhibit stronger management of your fatigue. When it comes to the pressures of shooting, or anything for that matter, do as they say: *Slow is smooth, smooth is fast!*

- You can hold your breath for a maximum of 11 seconds on average. After this point you must catch your breath, a physiological penalty that takes up approximately 3 full seconds.
- The amount of time needed to catch your breath is proportional to how long you hold it.
- Using the “naked-eye zoom” will hold your breath at the same time *if mapped to the same key*. This effect is likewise for the additional zoom on the M107, a pro or con depending on the circumstances.
- You can never run out of breath while in a crouch or lower stance. The same is of course true for any “locked” slow version of a stance.
- Though the farther you sprint progressively affects how steady you can hold your rifle, sprinting about 100m or more causes you to become so winded your reticle movement will be beyond the control of holding your breath.
- A very long sprint, that is, over several hundred meters, affects your breathing until approximately 60 seconds passes once you stop to rest. Only then does your character return to a normal breathing level. Be aware of the need to gradually slow your movement for at least 1 min after a long run and especially before you expect to shoot long-range.
- After taking any small amount of damage your reticle fluctuates so severely it makes the sniper's job incredibly difficult. In this case, egress to a safe location, and get your wounds headed to restore your shooting capability.

HIT LOCATIONS

As a sniper you have the kinetic potential to engage targets with surgical precision. It's fairly common knowledge that when targeting an enemy, you want your shots to be either in the torso (**RED**) or the head (**GREEN**) locations as depicted on the next page. OK, so that's a technical way of illustrating just how small your POA will need to be. In most cases this will result in the one shot kill you are looking for, satisfying the formula for an effective and efficient sniper presence. It is possible to get a kill by hitting an enemy in the arm or leg, or even by ricochet when using higher caliber rounds. Remember, your goal is to make sure your first shot is the absolute best shot and gives you the highest probability of taking the target down. Your movements, engagements, and planning should all be done with this fact in mind.

Although, aiming for the center of mass on a target is generally encouraged, if your target is facing you and their weapon is held in front of them at chest level, your round could be deflected leaving the target unharmed (and probably spooked as hell). This chance is especially high if the target has a large machine gun like the PKM or on weapon

emplacements such as D-30 artillery cannons, mortar tubes, or ZU-23s. Take a look at the target identification chart in Appendix 3A for examples of these targets. Depending on the angle of your shot, you might be looking at the possibility of your round being stopped by box magazines, tripods, or other guards/supports near the weapon. Keep the orientation and patrol patterns of your target in mind so you can make the shot count.

To achieve a head shot at great range is very difficult for a couple of reasons. First, your target area becomes very small the larger the distance making it difficult to hold a proper, steadied aim. Without a doubt your breathing must be under control for these attempts. Secondly, your range adjustments have to be spot on. If your read of the conditions is even the slightest under or over, the variables will compound. An enemy who has been left standing by a glancing shot is still a threat to your team. You should be practicing to make only head shots at long range since your opportunity to re-engage will not be quick. Sometimes the targets head may be the only part of that is showing. Your entire team is relying on your skills and to have the experience necessary to make the difficult shot when the time comes. Practice to always keep improving your chances.



Headshots are often just for show – try averaging your aim at the neck, between the GREEN and RED

ENGAGING STATIC TARGETS UP TO 300M



A target is spotted through the rangefinder at 252m

Holding on a target up to 300m requires at least one, often two adjustments. First, the sniper rifle must be “zeroed” to the right range. Since it is more correct to hold *over* a target, the zero in this case should be set to 200. The zeroing of your rifle is adjusted by the default keys <PAGE UP> and <PAGE DOWN> for either a higher and lower zero-distance, respectively.

TIP: For the dedicated player who finds himself in the sniper role frequently, it is useful to take the time to bind these two buttons to a more quickly activated and ergonomic location than on your mouse or keyboard than the default keys. Then your eyes will not have to leave the screen to search for a key and instead can focus on the AO, peripherally judging the HUD and cycling the zeroing up and down as necessary. Reflect: *An eye looking out, is intel coming in.* And in this spirit, it is preferable to utilize both eyes ...and you thought a manual couldn’t be funny?!

The second step of engaging will require you to mentally adjust for the distance leftover, the distance you are not zeroed for. Because the target elevation in this case is not far from your own elevation, it will not be necessary to calculate the Angle To Target factor. The physics and geometry explaining Angle To Target is covered in detail as part of Appendix 4A, but realize that with every shot the actual distance the round will travel is affected by the elevation difference between you and your target. If you cannot afford to miss, and need to hit a one shot one kill so the target is neutralized before you are compromised, the Angle To Target may need to be calculated or at least mentally factored in using a form of good ol’ “Tennessee Elevation” ...hey, it’s gaming and we’ve all been there.



With the sniper rifle now zeroed, the reticle should then adjust to your Point of Aim (POA), and then held over the target appropriately. That’s all there is to engaging and it’s very simplified at this short and even distance ...conditions, calculations, zeroing, POA, breath hold, trigger squeeze. Science does the rest.

ENGAGING STATIC TARGETS AT 300 - 1200M



A target is spotted at a range of 701m

Alright let's crank up the distance in this next section. Though still within the operating range of a marksman, shooting at these shorter distances needs to be mastered and regularly practiced by every sniper. You must adapt in order to outplay your enemy. If being closer to them will do that, go for it.



Shooting at longer distances requires no real difference in technique; however, depending on the sniper rifle system equipped, you will need to know when to apply the “hold over” method explained earlier. Moreover, due to the increased distance, you will encounter a greater Time To Target and with that a reduction in the damage your round will cause. For example, striking targets at 900 or 1000m is possible with the M24 even if these distances are past its zero range. Nevertheless, if you try this, expect to go through quite a few rounds before you are actually honed in and able to hit targets effectively. Then you run into the fact that more than just one 7.62 round will be required to drop a target at this distance so your target may get away; such is the science of ballistics.

NOTE: Think about the value of your target and always mind what is behind your target. *Is this shot worth taking if it will give away your position to the enemy armor, thereby negating any further intel gathering or other engagements of nearby targets?*

Practice is the name of the game here. Challenge yourself to expand your shooting palette by using different sniper rifles in different situations at different distances. This is the only true way to get a feel for it and you will want to be prepared for anything and everything when the shot counts. Each time you tackle a new scenario you build teamwork and knowledge for the future about how to successfully engage a target in those conditions. For you and your spotter, this is necessary to win the battles against the inefficiencies that will always try to creep into your craft. The more challenging shots you hit with confidence the better. Then you’ll slowly notice your sniper resume becoming more and more expansive, a resume that should elevate the output of your entire team.

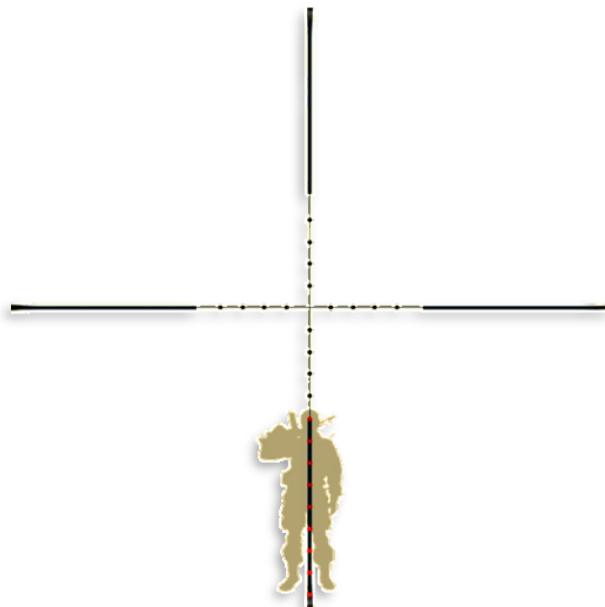
ADVANCED SNIPER MARKSMANSHIP

CHAPTER 5

EXTREME LONG-RANGE

As you no doubt are aware, most sniper systems have a zero range. When setting the zero adjustment and taking all other variables into account for a static target, your POA will be near the center of your crosshairs (due to no wind effects). The 7.62mm round sniper systems have a zero range of 800m, a decent distance on any field. Since Arma 2 simulates semi-realistic ballistics modeling, the neat part is that 800 or even 1200 meters is never the furthest distance you can engage. Using the 12.7mm (.50cal) round in the M107, AS50, and KSVK, in addition to the .338 Lapua Magnum cartridge of the British L115, you can reach well past 1200 meters. Ballistics is what gives the edge to these rifles when engaging at long-range, and what makes you a sniper versus just another boot-on-the-ground.

You can employ the hold over method discussed previously using even the thick black lines or “posts” to get the necessary POA for the range you need. If you look at the below image, you can see red dots projected over the bottom post of the mil-dot reticle. These are not exact, but are close enough to give you the idea. The sniper must imagine mil-dots traveling down the length of this black line. Using this idea, you now have a method enabling you to engage targets out to 1800m or further. However, a problem arises in doing this: you cannot see those extra mil-dots so to put it bluntly it is a bit of a guessing game. *SWAG anyone?* When you engage targets like this, you can judge the extra references, but it takes some practice making this repeatable since you cannot actually see them. A player with good eyesight, a strong ability to mentally visualize objects, and able to recall and adjust muscle memory can normalize this feat. This method holds true for any sniper system where you want to gain extra range. It can be done (and should only be done) when you can afford to dispense the extra ammo and mission parameters make it fine to spook the entire area around your target as your shots are lobbed in.



ENGAGING MOVING TARGETS

When trying to engage moving targets in Arma 2, each ballistic transaction you choose to make becomes a risky business. It is hazardous to your safety and ability to maintain overwatch if you give away your position because of too many careless missed shots. It takes a very experienced shooter to achieve hits on moving targets at great distances, but it does motivate you in pursuit of the craft. There's an irreplaceable feeling of success when all the variables are correctly accounted for — not to mention translated to inside the game — come together perfectly. Below are a few key factors to commit to memory for when your sniper team is engaging any target, more specifically, a target that is moving.

Distance To Target: Your distance to your target is important because Arma 2 bullets each have certain velocities assigned to them, meaning there is the travel time for a bullet to take into account. It could take up to 2 seconds or more for a bullet to reach its target, not including latency from all parties involved. Therefore, trying to hit a target that is in a full sprint without accounting for bullet travel time will always result in a miss. This is one variable to account for by *leading* the target or adjusting intersection, thus compensating for the bullet's full flight time.

Angle To Target: The angle you are to your target is very important; not so much for leading, but having the right range adjusted for. Even zeroed correctly, if you are shooting at a much higher elevation than your target the bullet will strike higher. The only accurate way to calculate this is by using the horizontal distance on your map to determine the correct Distance To Target. When you miss a shot, and you had confirmed all other variables for it, Angle To Target is probably the variable that ruined your shot. For an illustrated example on how to factor in your Angle To Target, see Appendix 4A. Also, read more on this idea in our Chapter 7 on Ballistics.

Target Speed: This just in: Targets move at different speeds. Your target can be casually walking meaning their speed is low and your lead should not be as great; or they could be running at a full sprint your lead should naturally be greater. Moreover, note that the target's speed is changing invariably by the angle of their movement.

Target Angle: If your target is moving from left to right at a 90-degree angle, you will need a greater lead than if they are moving at an angle less, say, 45-degrees from you. **TIP:** Plan your Avenue of Approach (AOA) with foresight: When the target is running directly at you or away from you, this is an optimal angle because this and a low Angle To Target can negate the target's speed. If the terrain suits this luxury, it will make you most effective and efficient do not become predictable though!

To engage a moving target you can employ two methods:

⊕ **Trapping:** This method works best when you are able to determine with some certainty the future direction and speed of your target. To perform: Place your reticle in the target's path of travel and fire when they reach the correct amount of lead. In short, your reticle is held still, you fire with anticipated lead, and your target intersects the path you fired the bullet on.

⊕ **Tracking:** This method is common (nearly habitual) and is much more suited for when the target's speed and direction of travel is erratic. To perform: Follow the target's movement with your reticle, add in a hastily-calculated and predictable lead, and then fire. In short, your reticle moves with the target and you fire in prediction of his expected next move.

ANTI-MATERIAL

The sniper systems using the 12.7mm or .50 cal rounds are considered anti-material systems for Arma 2. The round is designed to punch through armor or other objects, although with varying degrees of effectiveness on every vehicle. The two most vulnerable targets are jeeps and helicopters, as they are comprised of thinner metal and or partially bulletproof windows.

When it comes to jeeps, the anti-material rounds can punch through doors and windows, even continuing on to kill the occupants inside. Eliminating personnel is a often an effective way to disable a vehicle, but you have another option afforded to you: shooting the tires or rims. In Arma 2, when a tire is destroyed the vehicle is rendered immobile, and subsequently the crew chooses to abandon the vehicle.



The helicopter is much more difficult to hit than a jeep as it is usually moving at a high rate of speed and going through constant changes of angle. It is possible, though, to disable the helicopter by well-placed rounds in two vulnerable areas of the machine.

The first and largest of the targets is the engine, highlighted (**GREEN**) on one model below. Usually it can be disabled with the help of a couple well-placed anti-material rounds; this capability is something that enhances a sniper's deadliness even more. You need to be in a good position with enough long-term cover and concealment if attempting this because this will require multiple tries to get hits. If you have remained covert and quiet enough, your work may pay off and you can catch a helicopter "standing on its heels" making it much easier to hit at least once. The most vulnerable areas are the pivots of the main and tail (or anti-torque) rotors. Both of these locations are highlighted (**RED**) on the image below. Depending on your precision, it can still take one or more shots to fully disable the helicopter. Remember, different helicopter types have varying degrees of armor and different locations of strengths or weaknesses. We encourage you to explore the locations of other vital systems onboard by practicing and testing in-game.



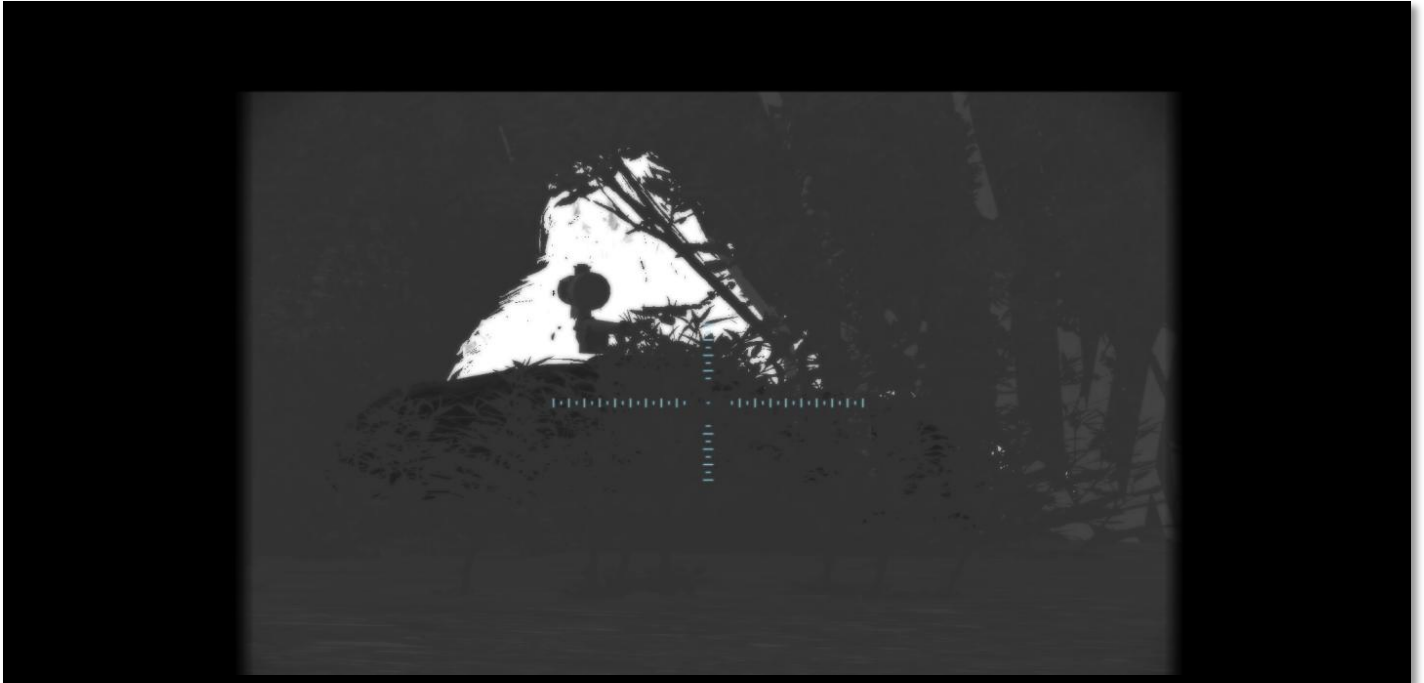
NIGHTTIME OPERATIONS

Operating during the hours of the night offers a sniper team some advantages and disadvantages. Here is one tactic sent to us by "Ryujin" a sniper enthusiast in Arma's PvP scene. Ryujin suggested the use of a backpack that, when placed on the ground, acts as thermal camouflage, minimizing the heat signature that can be picked up by a TWS optic. The first screenshot we performed to get an idea of its feasibility. The second pair of screenshots he provided which show the effectiveness of this tactic at a longer range, reducing your visibility to enemy counter snipers and vehicles equipped with thermal systems. As long as it is dark, or else it becomes a big sandbag, this can be a nice trick up a sniper's sleeve if there is no cover where you need to take a shot. In adverse weather conditions, where enemy forces might be more apt to use TWS, the added affliction to visibility may help even more to reduce the chance of your detection.

Ryujin describes the technique in his own words:

...when you look through your scope in Arma 2 you look through the actual scope on the weapon where it is in the game world. So you can stick just your rifle around a right hand corner and only expose an elbow (fair game in my opinion, simulating more tricky positions that aren't animated) and look down the sight. This right away lowers your signature, at the expense of only being able to see via the scope (and exposed on the

right side). To cover any exposed body parts, you drop the largest backpack you can get slightly to the right of your position as thermal can't see through it (best done before the enemy is observing your position). The backpack looks rock-like and will easily mask your thermal signature even more. In a pinch you can do this with just the backpack in open ground (though still best on a crest, where you can hide your lower body. You won't be invisible, but it'll break up your shape and reduce your signature by around 40% from the front. At a good distance this may be enough to avoid a casual sweep by thermal optics.



A close-up demonstration of a backpack and bush employed to mask the heat signature of the shooter

What a nice blend of cover and concealment. On the next page, check out at a side-by-side comparison of what this tactic might look like in the wild.



A White Hot TWS view at 230m: prone (at top) vs. prone using tactic to mask heat signature (at bottom)



And that's only at 230m. Imagine how effective this would be at a much further distance if a patrol or counter sniper was trying to acquire your position. We loved the creativity of the idea and appreciate your kindness in sharing it!

COMMAND FIRE

In certain scenarios, it is highly advantageous to direct multiple shooters to engage different targets (or the same targets) simultaneously. This tactic is often referred to as a “command fire” and is one of the most difficult sniper techniques to master especially true when you have more than one moving target. There exist very few documented tactics out there on how to perform it and in the real world even a handful of neat toys have been invented to increase a team’s odds. It’s very similar to room clearing ...only in an extremely condensed timeframe. During a room clearing, everyone knows what needs to be done and pretty much agree on how it’s done from room to room. Once you’re stacked up and “execute” is called, each person performs and your team’s inevitable improvisation that occurs is what ultimately is graded. Similarly, the nature of a command fire can be anything from the most calculated surgical procedures to off-the-cuff-A-Team theatrics ...and still succeed. The best course of action is to outline your plan just enough that, as it unfolds, you’ve ensured all prior training and teamwork can overcome any variation. There are no bonus points for precisely executed failures.

The Controlled Scenario

While it is feasible for a spotter on one team to try to coordinate his own shooter *and* a shooter on another team, this is not as reliable as leveraging a third party in the equation. Because the spotter has responsibilities to his own shooter, he is naturally biased and can’t do anything about it. A functioning spotter usually complicates a command fire, but if that’s all you have it’s better than one of your shooters managing the shot. The best structure for a command fire is to utilize a platoon-level unit leader or at best a Sniper Employment Officer (SEO) — an experienced field leader familiar with the mission objectives as well as the capability and personality of each sniper team. The SEO assumes the role of an indirect spotter externally located from all FPs, and may or may not even have eyes on each sniper team or target. The SEO’s first goal is to synchronize the intelligence and information between all teams and with other leaders as the scene develops. As an observer and not a participant, his unbiased perspective on the AO means he is in a prime position to reflect on ideas, relay decisions, and coordinate support should a team become compromised. For this reason, the SEO should have basic spotting equipment of his own and a small security team to act as QRF or access to direct CAS on hand. At the best opportunity, the SEO orchestrates the firing of each shooter using the sniper/spotter dialogue in the same way a conductor pieces together a symphony. A command fire is never going to be perfect and only has to be close. This tactic is the best-case method for a controlled, SWAT-style environment.

The Ad Hoc Scenario

For most players — predominantly those who are not members of an organized gaming community — the controlled scenario is scarce. After all, it is an ever-changing battlefield and chances are high that the mission isn’t sniper team-centric, meaning your team likely won’t have all the resources and time. As stated earlier, your team’s combined “improv performance” is what will either make it or break it. In this next scenario, we’ll deal only in

pragmatic and adaptable steps, trying to weigh in on a more technical solution for a highly volatile stage.

THE SITUATION: 3 snipers stumble across a camp with 3 enemies who are currently unaware of your presence. No matter what roles your sniper team is comprised of (i.e. two spotters and one sniper), and no matter their weapons, this method can always be applied. Below we offer a simple checklist to give your team the highest probability of success during a command fire in virtually any setting:

✓ **Each sniper moves to a FP and begins glassing all targets and sharing intel.**

Assign targets using descriptive language (garment color, headgear type, landmarks). As a matter of tactical principle, at least one shooter should be in a FP that's at a 90-degree angle off the target from a fellow shooter's angle.

✓ **The sniper assigned to the hardest target assumes control of the shot/dialogue.**

The hardest target is determined by this order:
most movement > least visible > furthest distance

✓ **The team agrees to move onto the engagement step. Dialogue is as follows:**

- Sniper 1: *"This is Sniper 1, I have control. Snipers report when ready."*
- Sniper 2: *"Sniper 2 ready."*
- Sniper 3: *"Sniper 3 ready."*
- Sniper 1: *"Shot in 3, 2, 1, "*
- *all snipers fire at the tempo of a silent 0*

Remember when preparing a command fire, the distance each shooter is to the target will affect the Time To Target of each projectile. For the rounds to arrive simultaneously you may have to plan for a staggered firing order; that is, each shooter breaks their trigger at a specifically calculated time different from one another. *How awesome is that to imagine!* Ballistic data such as the speed of the bullet and an accurate Distance To Target are necessary to execute a command fire cleanly. To reiterate, the insurmountable effect lag has on your comms along with the variable of the game's engine to process the ballistics makes this tactic most unreliable in practice.

A command fire feels awesome to perform and it's highly efficient. But, it's akin to one person trying to put a thread through the eye of a needle held by another person — the play call is rarely going to work well the first time *and especially when you need it to*. If the objective doesn't demand such a display of timed-precision and teamwork, then stick to a familiar plan with fewer variables. You should plan for your environment and make more unknowns known. If an enemy technical is bearing down fast on the flank of a squad and the situation necessitates ugly action that's cobbled together ...start a countdown and make it happen! The ability of your team to operate with a high success rate anywhere within this spectrum exudes true mastery of the craft. Decisive action is just as crucial as the most patiently taken shot. Ensuring the success of the mission always comes first.

SPOTTING AND TARGET DETECTION

CHAPTER 6

INTRODUCTION TO SPOTTING

There's no question that snipers are some of the best sharpshooters in the field. Besides, it's their core competency. However, if you can't acquire, identify, and engage your target with utmost efficiency and effectiveness, the role is insignificant. It is because of this, why we believe a sniper is only as good as their spotter. It's not surprise, we find this relationship extremely elemental and something that should not only be forged from naturally complimenting personalities, but also cultivated and practiced constantly. Think about the connection you and your partner share as one more variable you want to control. When your sniper team is operating there should be no internal noise affecting your routine.

Inherently soldiers try to move undetected, thus the sniper's job of locating and prioritizing them is made difficult. This is especially true when you have a very active, dynamic battlefield full of targets of all types and explosions and vehicle movements to track. These challenges make the time between "target spotted" and "target neutralized" an vital area a sniper team must excel at to be a successful team asset. As a sniper or spotter, you cannot make the mistake of just looking for silhouettes or you risk missing the smaller queues that give away an enemy's location. There might be times you can see only a leg, arm, or maybe the barrel of an assault rifle. You must train yourself to be vigilant, scanning for indicators of an enemy presence not in the usual shape of a man. There are three distinct optic systems a sniper/spotter team should make full use of while deployed.

OPTICAL SYSTEM ONE: NAKED-EYE ZOOM

The "naked-eye zoom" is something you should not overlook as a tool. It is particularly useful for giving the sniper/spotter a wide, detailed viewing angle of an area, is quick to flip on and off, and can even be done while on the move. The naked-eye zoom is performed by default by clicking and holding the <RIGHT MOUSE BUTTON>.

As opposed to all other optic systems, the naked-eye zoom avoids the dangers of tunnel vision. This optical technique is best used intermittently while in the field and plain and simple allows a sniper to see as much of the battlefield as possible, with an added level of zoom. The drawback — and why it's often called a "hasty scan" — is that it should not be relied upon for detailed searching. It needs to be employed very frequently to avoid the team from being flanked, and can even be done effortlessly with in 3rd person view if the mission settings allow. The naked-eye zoom is great for minimizing the attention garnered by changing your stance or turning your entire body around, all movements that could get you detected. Think about how a praying mantis turns its head without shifting its stick-like, concealing posture. This action works great for gauging close security, quickly distinguishing possible threats on-the-move, and helping you determine where your team might begin using more intensive scanning tools.



Normal view (at top) vs. Naked-eye zoom (at bottom)



OPTICAL SYSTEM TWO: RANGEFINDER / LASER MARKER

The second method of spotting is one of the best friends to both the sniper and spotter: Rangefinder or Laser Designator. For a sniper team to accurately engage enemy targets, the Rangefinder or Laser Designator must be part of their loadout. It is, after all, your best tool to recon and obtain information that leads to decisions. This piece of equipment is very easy to use. If equipped in your gear, pull out the Rangefinder or Laser Designator by pressing the default key on your keyboard.

Once you bring up either of these optical tools, take time to notice a few things: First, your field-of-view is significantly reduced as a sacrifice to your magnification being greatly increased — yes, it sounds obvious, but don't be surprised when you miss something right next to you or find a counter sniper climbing up the hill towards your position! Next, the high magnification enables you to distinguish friendlies from foes. Now the most important aspect of these optic systems is their range-finding feature, displayed just below the center crosshair. A spotter should try to range at least 3 well-distinguished, consistent landmarks in the AO. These landmarks should be a far one at the edge of your effective range, a closer one that the spotter will keep secure, and finally the "Clock" (covered over the next few pages), which should be at a centralized location between the two.

While using the Rangefinder or Laser Designator, don't let yourself fall subject to tunnel vision! Because there is no way to zoom in and out of these tools smoothly, you must avoid missing what is happening in the environment around you. Also, be aware that when you select these optic systems, your character is "locked" to a painstakingly slow and cumbersome pace. **TIP:** Moving while crouching is faster than standing when the Rangefinder or Laser Designator is in your hand and does not negatively affect your breathing as much.



View as seen through a Rangefinder

OPTICAL SYSTEM THREE: SNIPER SCOPES

The last optic type we'll cover is the scope, a prominent feature on a sniper rifle and an extension making it a sniper *system*. The idea here is that you should choose the sniper rifle with the most appropriate magnification or feature for the mission. The various "long

rifles” in Arma 2 come equipped with scopes of varying or perhaps zero magnification. You should consider growing to playing around with all optic variants, learning the best application for each. Review Chapter 1 for how to use a scope, namely the diversity of reticles you’ll run across. There is far too much to cover when it comes to the best combination for a specific scenario, and even then, each player has different preferences. When preparing for a mission, your experience is going to be your best ally in this department so get practicing — *get outside of your comfort zone!* If available, you can change the magnification on a scope by using the default keys <NUM +> and <NUM -> on your number pad or, in the case of the M107’s continuous optic, simply hold the <RIGHT MOUSE BUTTON> down.



A contrast of the default magnification: M24 scope view (at top) vs. M107 scope view (at bottom)



That's enough with the basics. The next sections discuss more about the rituals carried out by a sniper and his spotter in order to operate at peak performance at any given AO.

THE "S.N.I.P.E.R. SEQUENCE"

We have developed the "S.N.I.P.E.R. Sequence" as an easy-to-remember acronym to aid in the systematic functioning of a sniper team from objective to objective. Together, the sniper and spotter works through each step in sequence for each objective, or may move between the middle steps as demanded by a changing mission or battlefield. These steps are a plan of action that ensures a sniper team thoroughly and adequately covers all fronts.

- 1. SETUP** - This begins as soon as you hit the ground. This stage includes securing the immediate area and making a hide, concealing any extra equipment with you, and/or is about locating or getting to one or more of your Firing Positions (FP).
- 2. NEEDS** - Once you hit the AO and are setup at your FP, next you must establish your needs. Determine the "Clock", split the sector if appropriate, and develop notes and a memory for various ranges to landmarks. This is the time to prepare everything.
- 3. INTEL** - Now that your basic needs are covered and your team is on the same page, you are ready to begin gathering intelligence. This requires observing key features of the AO such as priority targets for your friendly units as well as the paths and whereabouts of the enemy force as a whole. Also, note any changes that differ from your briefing. Observing and relaying intelligence may or may not be a lengthy process; it really depends on the mission.
- 4. PRIORITIZE** - Intelligence gathering never really ceases during your time out in the field, but at this stage targets are identified, prioritized, and ranged.
- 5. ENGAGE** - Target priority is your number one concern and works hand-in-hand with the actual step of engaging them. Choosing to engage a target should be done only when cleared to do so and the consequence of revealing your position has been considered.
- 6. REVIEW** - The review process has two parts to it: First, it stands for the constant adaptation and application of this process in an AO. For instance, as objectives, positions, and orders change on the field, the process should begin again. Secondly, this step involves reviewing and improving the performance of your sniper team after the action. (What was not as expected or different from your briefing? What went bad? What went good? How effective were the decisions you made and how efficiently did you carry them out?)

When put into practice, this process turns second nature and you'll be surprised at how disciplined and fluid your communication happens; how organized and deliberate your

actions become. This plan will empower a sniper team to acquire and engage targets more quickly than ever before, in addition to being more prepared for the introduction of any unpredictable event. Soon you will gain more knowledge about each other as a partner and this will only grow stronger with hours spent together in the field. If possible, you want to reach that point where certain things do not require words. Eventually, your anticipation of each other becomes the key to weathering all the challenging scenarios and variables working against you and the successful completion of your mission.

SPLITTING A SECTOR AND RANGING LANDMARKS

Below, a town is partitioned using a pattern of roads as separate fire sectors. As you can see, we have split the AO into 3 different, imaginary sectors based on the orientation of these roads. We now have three sectors to reference: Left (highlighted **BLUE**), Center (highlighted **RED**), and Right (highlighted **YELLOW**). The purpose of this added calling convention is to allow the spotter to initialize a call with dialogue such as “Target left sector...” and the sniper’s eyes can now begin to read the area left of the leftmost road. The spotter’s next lines can then offer a more precise description of where the target resides — we refer to this exchange as the act of walking the sniper on target. You’ll learn more about this and other methods in the forthcoming sections.

Techniques in this form and related methodology can be a huge aid in the handoff from spotting to engaging. Easy-to-remember landmarks and terrain features all serve the spotter in their prime task to get the sniper on target fast, even before any range needs to be translated. **NOTE:** If the particular AO doesn’t enable this technique to offer any benefit, dismiss it and opt for less complex “walk on” language!



Visual indicators in the form of landmarks are important because as fixed, static objects they offer known ranges for quick referencing, usually eliminating the need to pull out a

range-finding optic. In the heat of battle, when the spotter might have to engage an immediate threat, and is therefore unable to provide ranges, the sniper can use the target indicators previously established as a baseline for his engagements.

TIP: If available, place a navigation point on the map by holding <LEFT SHIFT> and clicking the <LEFT MOUSE BUTTON> on the map in the center of your AO or objective. This feature provides you with a central, consistent 3D marker to reference target ranges. Below is an image of the 3 landmarks that would make for great target indicators at this given AO.



A secondary function of using the 3-landmark technique is revealed in the same image. The minimum and maximum spotting and engagement ranges are now automatically set for the sniper and spotter (circled in **GREEN**). Using these as a reference, the spotter should engage any targets at or below the first landmark (bottom circle). Meanwhile the sniper can remain focused on spotting and engaging potential targets around the middle circle. This middle landmark, is most often the same as the “Clock,” a method explained in the next section. We all know the enemy does not stick to one particular area. If the enemy moves close enough to threaten the position of the team, the spotter should engage without hesitation, during which the sniper should stay on scope, ready for the longer engagements. Applying the 3-landmark technique is the most efficient way for a sniper team to cover an AO, minimizing any range uncertainty and overlapping fire sectors.

THE "CLOCK" METHOD



The "Clock" method is one of the most effective techniques for a spotter to call targets to a shooter. When a sniper team reaches their FP, the spotter designates what we call the Clock. This should be anything easily seen by the sniper and spotter, a centralized and permanent structure, and one that is taller or more recognizable by color/feature than other landmarks in the area. For this example, the Clock is the center building and the red (**RED**) dot is an enemy target. The spotter can call something along the lines of *"Target 11 o'clock, 50 meters off"* and the shooter immediately knows the slice of the AO the target is in. The spotter could change the location of the Clock if need be, but it shouldn't be changed so often that confusion is induced. One Clock per objective or AO is enough. This method is versatile, powerful, and can be understood by a variety of players, no matter the depth of their spotting background.

Here's another example: Say the shooter eliminates that last target, the spotter could even use language to form another call like *"Target 9 o'clock from last kill..."* This method is not really new nor is it hard to learn. Chances are most players know how to refer to a clock direction. The key is to get in the mindset of projecting this idea out to the area that concerns the mission of a sniper team. Most importantly: make this method work for you. Allow the dialogue to be as efficient as possible and establish powerful walk on language. Using these things in combination with each other makes for very effective sniper operations and why refining the relationship in the sniper team or unit is essential.

WALK ON DIALOGUE

These lines below should shape the basic dialogue used by the spotter to communicate a target's location to the sniper. To demonstrate the Clock method used in conjunction with walk on dialogue, we refer to the same image above where the target is located at the red (RED) dot.

Here is standard dialogue between a spotter and shooter when the sniper team enters into the step of engaging:

- Shooter: *"Sniper ready"*
Spotter positively IDs and prioritizes a target
- Spotter: *"Target, AT infantry, 11 o'clock, 50 meters off"*
- Shooter: *"On target"*
- Spotter: *"Range is 952 meters"*
- Shooter: *"952 meters"*
- Spotter: *"Fire when ready"*
Shooter engages the target
- Shooter: *"Target down ... Sniper ready"*

Keep in mind this process is rarely as smooth as described above, but if you get to this point your preparation has paid off. The common phrase we've adapted for this purpose is KISS, which we adapt to mean "Keep It Simple Spotter." The more words it takes to walk the sniper on target — or if too much extraneous information is passed along — the spotter risks complicating the call and causing a missed opportunity or shot. A missed shot threatens your concealment and subsequently affects the difficulty of your mission later. You have to try as hard as possible to stay this calm and collected over comms while even bullets are going over your head!

The shooter will have other personal calculations to account for quickly in order to place the round effectively. For this reason, it's easier for the shooter to adjust for any re-engagement. Walking a sniper on a target is never easy to master, taking many hours of trial and error just with one partner. Work hard to get the communication void of any emotions or running commentary. What we're looking for here is that systematic, well-oiled machine conversation; a verbal process free of any of the variations you can control. Start by refining and acclimating to standardized language in your team, and then evolve from there.

TARGET PRIORITIES

There are many players (dare I say marksmen?) who believe that simply by picking up a sniper system they are a sniper. Being a sniper is more than just being able to shoot at long-range targets. Most importantly, being a sniper is about knowing when to shoot or not, as well as discriminating against targets even *worth* your shot. Out in the field, everyone must do his part: A sniper should not become a marksman; a marksman should not become a

sniper. You may only begin to be called a sniper when you master certain skill sets that make you more than just a good shooter.

One of these skill sets involves identifying targets and prioritizing all of them. Recall that at times both the spotter and shooter must do this. The threat can be to you or aimed at friendly aircraft, vehicles, or infantry; maybe even all these at the same time. It can get hectic and distracting out there — *know exactly what your mission is and don't overwhelm yourself by trying to do too much ...true scope creep (pun mandatory!)*. If tasked with providing cover to an infantry squad on the move, you should be prioritizing targets that are a High Value Target (HVT) to that squad. Performing *your* role to the best of your abilities frees them to perform *their* role for the benefit of the team's mission.

As a sniper, your target priorities should be as follows:

1. **Enemy Snipers/Spotters/Marksmen:** These are the opponents who not only have the weapons with range to hit you, but also the mission to do whatever they can to stop you from doing yours. It is similar to two queens battling in a game of chess: each has a very long range of plays on the field that can only truly be leveraged for victory when their counterpart is not actively threatening them. Also, spotters pose a threat by directing indirect fire. *Keep moving, stay unpredictable, and use all your senses and instincts.*
2. **Emplaced or Static Weapons:** Many static weapons multiply the enemy's effects and prevent your team's movement. With well-aimed shots, you can either knock them out of commission or cause some serious logistic disarray. Any static weapons near an advancing friendly squad should be a priority.
3. **Infantry:** There are many different types of infantry: AT, AA, machine-gunners, and even spotters for artillery/mortar teams. Eliminating their field leaders or suppressing them with fear and limited visibility because of having to stay indoors, inflicts severe damage to their ability to outmaneuver your ground teams.
4. **Vehicles:** Most vehicles you cannot do much about and you will significantly waste your time and give away your position trying; however, if you are carrying a Laser Marker you can direct air assets on a target or without one at least help by relaying the intelligence to your leaders or friendly forces on the ground.

NOTE: Visit Appendix 3A for a more comprehensive target identification list providing you with the typical weapons or dress of different enemy types in Arma 2.

Intelligence gathering and selectively eliminating targets by priority transforms your relatively small-sized role into an exponential force enabler. You are no longer indiscreetly shooting at targets as a marksman might; rather, your influence on the battlefield becomes something much more lethal to the strategic effort of your enemy ...*a SNIPER!*

BALLISTICS

CHAPTER 7

BULLET DAMAGE

It is a well-known fact that the world of Arma 2 simulates some version of realistic physics, and because of that, we rejoice. The ballistic properties of various rounds are important to understand. Simply put, as your firing extends beyond the max zero range of your rifle, the smaller bullet sizes or calibers will inevitably do less damage. **NOTE:** Data in Appendix 2A can give you a good idea about the difference in ballistics from weapon to weapon. On the range charts, although there are a few exceptions, generally if the value is 1.00 or greater it can kill in one shot if sent at the center of mass.

BULLET DROP

Bullet drop is an active element in Arma, of course. Most sniper systems have the ability to zero out to a distance to adjust for this allowing you to use the center of a scope's crosshairs to engage targets out to their max zero range. If you engage an enemy beyond what your sniper system can zero to, it is then necessary to use the hold over method. In the range charts we provided weapon data showing characteristics like the holdover, speed, and damage at incremental ranges. At the very least, these charts give you the mil, tick, or chevron reference to help you adjust your POA for engagement of targets in between and over your weapon's zeroing intervals.

BULLET TRAVEL TIME / LAG

Trying to hit moving targets is tricky for a few reasons. First, the bullet travel time is consistent; your lag however, is not. Latency, better known as lag, is an accepted fact of gaming over a network connection and can easily have a play in what you can and cannot do. Through practice, you will gain experience and more often than not achieve the point where you can overcome even the smallest amount of consistent lag existing naturally in any online game. Eventually you will grow better at hitting targets on the move.

NOTE: An approximate ballistic travel time is provided on the range charts in Appendix 2A to give you an estimate of your Time To Target at different ranges.

FIRING POSITIONS AND HIDES

CHAPTER 8

Selecting a suitable Firing Position (FP) is probably the most important aspect of being an effective sniper. Several things affect the FP and/or “hide” you select. First things first, “Does it allow me to view a sector covering the mission?” It does not matter how great a spot you have found if you cannot see the AO, or enough of the involved area you are responsible to cover, consider it useless. Secondly, “Does it have a good Avenue of Approach (AOA)?” A good AOA is where the enemy will be moving either towards or away from your FP because enemies who respond to the battlefield by moving left-to-right are more difficult to engage.

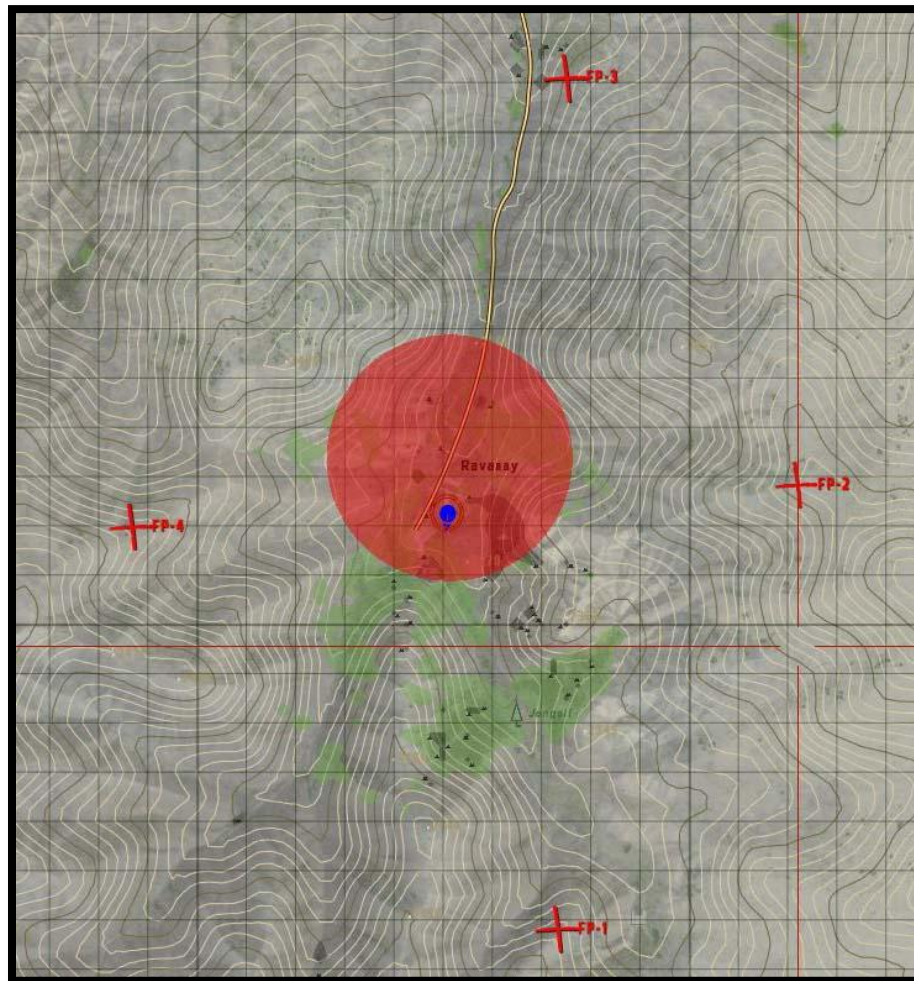
There may come a time in a mission where a leader directs you to cover a certain sector, limiting the level of control you have on your location. In this scenario, adhere to the request and find the best position that lies within what has been asked of you. Remember, your team, and the decisions made by those who lead it, should be considered first. If at any time you feel you cannot cover your given sector effectively, simply politely request to relocate. Just make sure before doing so anyone relying on your eyes or trigger is aware you are no longer watching over them. If you cannot move due to the situation, or are plainly ordered not to do so, make the best of the situation. You are playing one role and you must trust in the information your leaders are compiling and the decisions they are making, just as they should come to trust your recommendation for what is developing on the ground. Be prepared for anything, for when your team needs your gun or your eyes, and do your job humbly to the best of your abilities.

FP SELECTION

When selecting your FP, you must consider a few things beyond whether or not you can cover the assigned area. This is where a sniper is really tested on his mastery of the craft. Put plainly, you want to be in a position viewing a sector where your target will appear most often. You don’t want to be in a place where enemy patrols can pop up right next to you and you might be forced to compromise your position in reaction. This usually means your selection will be on an elevated position; however, there are trade-offs to this. Maintaining a ballistic advantage over the enemy range-wise is vital, but if you can help it, you don’t want to be at such a high angle that you are required to do Angle To Target calculations (explained in Appendix 4A) for every shot. Moreover, a high mountain could mean the view of your flanks and the foothill below is partially blocked. These features endanger your ability to see threats before they see you. Such terrain masks an enemy spotter, infantry scout, or patrol vehicle advancing on your position. Look for a location inconspicuous to the enemy, a place where they least suspect a sniper to firing from.

When moving in the field, running across ridge tops on the top of a mountain can be a fatal mistake. While en route to your FP, you should never run across the tops of hills, period. The reason for this is that you silhouette your figure across the sky. This contrast against the sky makes it incredibly easy for the enemy to spot you even from a great

distance. Instead, you should be moving through valleys, forested areas, or behind hills so the enemy has no LOS on you, this keeps the cards in your hand. Avoid setting up your FP on the front sides of mountains or hills. This is because you will have trouble during egress if your FP is compromised. Additionally, lying prone downwards on a hill could mean the lower half of your body is exposed as positioned lengthwise up the hill. *Rarely is it ever worth giving up the high ground for a shot.*



Potential Firing Positions (FP's 1 through 4) are marked around a Takistani town

For the purpose of discussion, we have identified four possible FP's and have placed red X's at each location. Each FP is less than 1000m to the center of the AO (shaded here in **RED**). Practice your map skills by counting the grids and then estimate the distance to each.

FP-1: Overall, this first position is a very well rounded position, but with a positive AOA it does lack a wide perspective of the AO because you would be looking through a valley. The FP has decent elevation, though not too much, and lastly will allow for egress South away from the AO.

FP-2: The second position is on a much higher elevation, which would affect your zero range due to your Angle To Target. While it does offer a great view of the AO, this is at the expense of leaving your body a little too exposed on the face of the mountain just to engage down it.

FP-3: Next, the third position is similar to the first regarding a good egress route and angle. However, its narrow view would force you to look through a valley, opening your flanks up.

FP-4: The last position while high in elevation could be too close to the action. Expect to adjust for Angle To Target frequently. Egress is good with a good perspective of the entire AO.

These are by no means the best or worst FP's to be in, nor the only available. In the end, you will have to compromise and do as much homework as you can to prepare. *Trying to achieve the "perfect FP" is futile and could prove time-costly to your mission.*

Three primary criteria to keep in mind when selecting your FP:

- **Based on the objective, what is an adequate fire sector size and what is the predicted enemy AOA?**
- **How large is the Angle To Target going to factor into your shooting sequence?**
- **Are there egress routes to provide your team with safe, defensible options?**

Selecting Firing and Alternate Positions takes time and intel will be your best friend. Realize the selection of your FP will directly determine your overall effectiveness as a sniper on the battlefield. A poor FP choice equals combat ineffectiveness, regardless of your shooting talent.

COVER , CONCEALMENT, AND INFILTRATION

Another factor to be aware of is the cover and concealment available wherever you are operating. It is best to have a hide that has a good combination of these. Having good cover allows you the benefit of being able to take fire from the enemy with relative safety until you can use your egress route. Things that you will most likely use as cover are low walls, rocks, large trees, and buildings. While good cover is important, concealment is equally as significant. Concealment provides you an added benefit by breaking up your outline or covering most of your body. With much of your outline broken up and profile minimized, you are much harder to detect if an enemy is scanning trying you to pick you out of a bushes, trees, etc. Ghillie suits work well for this purpose, but their color and patterns can vary making it imperative to be aware of the environments you will be waging combat.

Once you have located a position on your map or already have a known, proven position, how you infiltrate to your firing position is very important. We must mention that we say infiltration for a couple of reasons. First, you are in enemy territory; just because you are 1000m out from an AO does not mean you will not see the enemy along the way.

Secondly, your firing position should be a secret to the enemy; you *infiltrate* your firing position because you do not want to be seen entering it. If seen entering your FP and/or hide, then you, your mission, and all the friendly forces relying on your unique application of fire become compromised. It is costly in numerous ways to have to relocate.

Three modes of travel to get your boots on the ground so you may then infiltrate into your hide are discussed below:

1. **HALO Jump:** This is probably the most efficient way to get into an area quickly while staying undetected. Quiet, low profile, and able to adjust the plan while in the air, it leaves you vulnerable and without any firepower.
2. **Helicopter:** This can be an effective choice too; however, you are exposed to the threat of AA while en-route. This approach is also very noisy and if your LZ is too close, you will have alerted the enemy to your presence before you are even in position.
3. **Ground Vehicle:** This is an acceptable choice if available. If given the time to travel, a vehicle can at least get you to your RP or a camp prior to a final hike into position. Unfortunately, most vehicles move too slowly over the mountainous terrain. Noisy but quick for escapes, it does offer the possibility of added cover, supplies, and/or firepower.

In the case of both HALO and helicopter insertions, the LZ should be at least 500 to 1000m away from your final FP where you intend to fire from. Again, you want to *infiltrate* your firing position ...not land the helicopter, get out, and lie down right beside it. The odds of you being seen increase greatly with the attention anything like a helicopter receives. The benefit of entering your AO at a distance is that if you happen to be spotted on your way in you can use the formation or features of the terrain to confuse the enemy of your eventual positions. Make use of the different stances and speeds explained in earlier chapters like the standing sprint, crouch run, or crawl when moving across the terrain appropriate to each. There is no point getting to the position of your FP fast if you will become engaged or killed en-route.

LOOPHOLES

Some of you may have run across this term and have wondered what a “loophole” is. Most of you probably already use one without even realizing what it is, how significant it can be, and its advantages and disadvantages. This section will cover the idea of loopholes, effective usage of loopholes, how to shoot from loopholes, and how to engage targets inside a loophole.

Keep in mind that the term “loophole” has two different meanings — one being a small space from which to shoot from or into, and the expected bullet trajectory arc. For the purpose of this section, we refer to loopholes as the former, a small space to shoot either from or into. The idea of ballistic trajectory arc is explained separately to avoid any confusion between the two.

What is a Loophole?

A loophole is a small figurative “window” for a projectile to pass through. Depending on the perspective of how you utilize a loophole, the loophole could be a doorframe or window from which you are either shooting out of or into. Alternatively, it could be the visual width between something like two trees or walls. When employed correctly, a loophole can be a powerful tool in a shooter’s arsenal to conceal their position by visual and audible measures. Some loopholes can be created naturally with the use of objects, which minimize your visual signature and or may also provide cover in the case of return fire. Objects like a rock and a bush, maybe two buildings, a crack or hole in a wall, are all examples of spaces between objects and can be used as a loophole. Loopholes can generally be “opened” or “closed” with your motion thereby physically altering the viewing perspective you (and the enemy) have through the objects, changing the size of this window. Such is the art of angles.

Using a loophole can be to a shooter’s advantage, but it also carries risks. Like any shooting, a good loophole will allow you to neutralize your intended target and subsequent ones after that if necessary. Note that there are plenty of risks. Trying to use too small of a loophole could cause your bullet to hit the obstruction itself along its way. This could completely compromise your position and ruin your element of surprise. Let us now explore two different styles of loopholes you might employ as part of your craft in the field.

Engaging Targets *From* and *Into* Loopholes

Engaging *from* a loophole is the act of shooting through a loophole when you are positioned directly behind it. This style is pretty much lends to the definition of a “hide” and most snipers perform it instinctively upon entering a firing position with enough cover to shoot out of. The funny thing is a sniper may not even be actually utilizing a technique at all; it is such a natural exercise to perform during combat. In essence, loopholes like this function by breaking up your outline and masking your shooting position from their view. This method leaves the target nowhere to hide, unable to see you until he discerns your cover/concealment, and helps in suppressing a target or glassing an area for a sustained period. Provided your cover and concealment are good, you are rewarded with a large sector of fire and an enemy who has to work hard to locate you while not exposing his self. Unlike the next loophole type, the upside to this traditional approach of a loophole means you are not near as affected by tunnel-vision over distance, though some still exists.

Engaging targets *into* a loophole is the idea of sending rounds through a similar figurative window, but this method differs in that the objects working to create the loophole are between you and the target. The idea here is that you are not just positioned close behind the objects that are screening you; rather, you are essentially shooting through a “tunnel” of objects. Loopholes like these can be as large as you wish, but can only be as small as the projectile’s full path. Clearance for the projectile itself to pass through in addition to its ballistic trajectory arc needs to be factored in when successfully using this loophole. The biggest issue you will probably encounter, especially with longer ranges, is having enough vertical clearance for the ballistic trajectory arc. The ballistic trajectory arc is the path which the bullet follows from the time it leaves the muzzle of the rifle to the

impact point. This arc varies depending on the type of round you are firing which directly correlates to the velocity it's traveling at through the air. Keep in mind that shooting at longer ranges is essentially "lobbing" bullets in a specific arc due to this velocity decreasing more and more over distance, becoming less of a flat shot. Here is an example of this loophole:



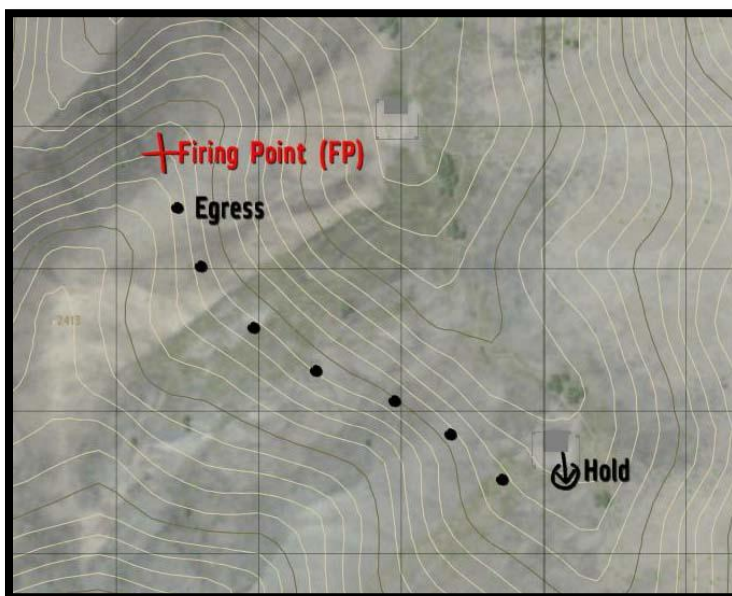
Knowing how the ballistic trajectory arc is important because in this example, had I been a few feet forward from my current position, the bullet would actually hit the tree branch and my shot would have missed completely. Acquisition and tracking of the target is good for the moment but bad over time. This is why shooting into a loophole is really only effective against static targets. If the target here moves as little as 5 feet, my loophole is no longer a viable option due to obstructions along the arc. The feasibility of employing this method changes drastically based on the distance the loophole is away from you and the target, all in relation to the bullet trajectory arc.

EGRESS TACTICS

Once you have selected a suitable Firing Position (and an Alternate Position that still achieves coverage of the initial fire sector) you'll want to make sure you establish egress routes for both or at the very least a plan to stay together. It is important to have these two positions planned out beforehand so in the event you do come under fire, you're not scrambling around trying to figure out a new plan; even worse is being split up from your teammate when the bullets start flying. You'll want your egress routes to break the enemy's

LOS while offering you options to either maneuver to another FP, or alternatively, take a defensive stand until reinforcements or extraction can be arranged.

When you become engaged and are eventually forced to exit your hide, ensure you relay your intentions to the SEO or Platoon Leader so your teammates are aware that you are no longer “on scope” or have overwatch for them. Remember: Mission success is the most important! As soon as you break contact, you should start the process of relocating to a new hide or FP, preferably one that is a good distance away yet still in view of your previous route. This will minimize any residual threats from spotters, patrols, or off-road recon forces that may continue looking for you. You want to see them before they see you.



An ideal egress route from FP-1

The above image illustrates a potential egress from the point of FP-1. Note carefully the direction of travel and contour of the terrain traveled in relation to the enemy’s perspective. Even on the face of this ridge, you will be able to hide behind the crest within 5m enough to break LOS without giving up too much of the height advantage. This method of travel is referred to as the “military crest” and is the proper way to navigate a hillcrest to stay out of view.

Following a successful egress, the sniper team should move to a safe location and hold where they then can reassess the situation. If the situation is good and there are no pursuing enemy forces, the sniper team can then plan to relocate to your AP (Alternate Position). Maybe the choice has to be made to trek to an entirely new FP. If you are still being pursued, buildings provide a good defensive position to defend yourself from what is bound to be a larger force. Use all possible elements of surprise or tactical ambushes to give you any advantage if it comes to this situation. Only when you are sure it is safe to move, establish a new plan and continue with the mission or coordinate for a RTB.

FINAL THOUGHTS

In closing, remember your team is a vital part of you maintaining your ballistic advantage! It makes no sense to move in closer to get more kills if you're going to die many times (that's time lost not covering teammates) or being forced to relocate too often. This can put your team in a perpetual state of being pushed back and ultimately surrounded. What is more, it doesn't make sense to sit far back and not use your unique position to be that extension of your friendly force your role is supposed to be. *Who Dares Wins as they say*. Well, make it a calculated "Dare" at least. Be smart about what you pick fights with and realize you have to balance being there to help fellow teammates who are covering your closer angles or flanks on the battlefield. These types of calculations are harder to understand and put into practice than the ones you'll be using to shoot well.

Lastly, embody the spirit to do more than evolve, especially more than your enemy who will be trying to do the same thing. When the technological fight is fair, and the terrain demands the same tactical options for both sides, only a practiced physique of creativity and willpower will give you the edge. For this reason, a core thread of our thinking on the art of war is that beyond the classic ability to adapt, improvise, overcome, and yes, even something greater than to evolve, there's must exist a form of intelligence orchestrating the strategies down to tactics. There must be some analog variable that balances risk versus reward, continually measuring every action throughout this entire lifecycle; some force that motivates us and acts as a governor. Gamers often refer to the "metagame" to explain what occurs at this height. What drives a player to seek out advancing this higher level of strategy? Having a strategy of any depth ensures that you look at the horizons past the horizon your opponents are fighting on. What good is it to overcome your opponent if it puts you in a position where you're easily defeated by the next? Contemplate what each of these ideas mean to you – in and out of game. Then consistently challenge yourself with new scenarios and drive towards better stats to keep sharp and stay ahead. *You can expect to hear more on this thought in the future.*

This ends the current work on the Sniper Operations Manual for Arma 2 by [GETactics](#). Please send all feedback and comments to GETactics@gmail.com, and continue the conversation on Twitter [@GETactics](#). We'll be happy to update or explain our work if any portion of this manual is unclear or inaccurate. Our goal is for our materials and thoughts to be organic above all else. We feel the best information is that which strives to be relevant and remains practical for use in the field by gamers. Moreover, we'll try our best to maintain all content so it reflects any changes that occur to the game. You can review the changelog for this manual on the last page.

We hope v2.0 was worth waiting for. If we didn't find ourselves with enough time to devote getting this version to a level we were satisfied with, it was because we were enjoying ourselves in Arma 2 & 3 ...and of course all the other real life stuff that happens too. Besides, writing the entire time can make your gaming skills rusty!

Don't forget to follow our latest endeavor, *Gamers Engineering Tactics*, by signing up and bookmarking GETactics.com where you'll find more of the same



tools, techniques, and commentary — all engineered for you and your team to advance your gameplay. As an appetizer for the long rifle crowd, our website will feature mobile-friendly range charts and other information. You'll be able to employ what you learn from this manual seamlessly while you're in the field. Thanks in advance for your support!

ACKNOWLEDGEMENTS

NoCents who helped with the development and management of in-game badge tests, even one that is inspired heavily by the content of this manual. Your quiet and reliable service helped to fulfill an early goal of ours and kept at it, taking it to unimaginable heights. You should know that we're regularly inspired by your play style and mindset in the craft; your craft seemingly anything you put your mind to! I trust you will remain an indispensable resource for our future work.

Lucky for lending an incredible amount of time and talent to developing AIT and cultivating the nucleus that underlies TAW Arma's training program. We have always been able to count on your rare balance of wise leadership and willingness to roll up your own sleeves at the same time. We're the lucky ones to have met you so early on in the journey that is this game. Semper Excelsior!

Boris for contributing words and perspectives on select topics for v2.0. We look forward to seeing more content and thoughts from you down the road.

Kronzky, already well-known for his work in the community, is the author of several classic and ingenious scripts and addons for the Arma series. His work was a cog on the gear for us to collect data, thus completing our earlier attempts at ballistic and range charts. This ultimately enabled us to make the manual more actionable. See more of his brilliant work on his [website](#).

Bohemia Interactive Studios: For Arma 2 — an awesome game to be involved in. We understand that it must not be easy to be a developer of PC titles solely and we applaud your work ...even if certain bugs are difficult to swallow every now and then. Games of this depth and caliber are why players like us choose to game on the PC platform and your attention to detail never goes unnoticed. We're looking forward to much more with Arma 3 and we believe you're on your way to delivering. Keep up the fine work and don't forget your diehard fans!

All our supporters: Your collective interest, donated talents, and appreciation of the finer elements of this game make it worth our time. We'd love to hear all the ways you're enjoying and applying this manual in all your Arma experiences. We wholeheartedly understand where your passion comes from. We hope to see you over at GETactics.com.

APPENDICES

WEAPON COMPARISON TABLE

APPENDIX 1A

Name	Round	Fire Mode	Mag. Size	Zero Range	Max Effective Range*	Optic Types Available	Notes
M107	12.7x99 mm	Semi	10	100-1200 m	1450 m	Mil-Dot / TWS	1, 2
AS50	12.7x99 mm	Semi	5	100-1600 m	1850 m	Mil-Dot / TWS	1, 2
KSVK	12.7x99 mm	Semi	5		1250 m	PSO-1	2, 3, 6
L115	8.6x70 mm	Bolt-Action	5	100-1400 m	1600 m	Mil-Dot	1
CZ 550	9.3x62 mm	Bolt-Action	5	100-800 m	700 m	Hensoldt M1	
M24	7.62 mm	Bolt-Action	5	100-800 m	700 m	Mil-Dot	
M40	7.62 mm	Bolt-Action	5	100-800 m	700 m	Mil-Dot	
M110	7.62 mm	Semi	20	100-800 m	700 m	Mil-Dot / NV / TWS	1, 4
DMR	7.62 mm	Semi	20		700 m	Mil-Dot	1, 3
SVD	7.62x54 mm	Semi	10		700 m	PSO-1 / NV	3, 6
Mk17 Sniper	7.62 mm	Semi / Full	20	100-800 m	700 m	P4	4
Mk17 Sniper SD	7.62 mm	Semi / Full	20	100-300 m	300 m	Mil-Dot	4, 5
Mk12 SPR	5.56 mm	Semi	30		300 m	Mil-Dot	
VSS	9x39 mm	Semi / Full	20		300 m	PSO-1 / NV	3, 5, 6

**Maximum effective range means our opinion of actual battlefield capability based upon the consistency of the weapon's reticle reference marks, accuracy, and damage properties – using the standard optic. In short, engaging beyond this range should be considered irresponsible use of the weapon system as it will not guarantee a one shot one kill, will fail as support to your team, and will be a waste of ammo.*

Corresponding Note Number:

1. Zoom Function
2. Anti-Material
3. No Zeroing Capability
4. Shares Mk17 Magazine
5. Suppressed
6. Range-finding Reticle

WEAPON RANGE CHARTS

APPENDIX 2A

NOTE: The holdover values given in these range charts assume the weapon's highest magnification is used, and proper technique of zeroing to the next available zero value below the target's range is followed (i.e. "rounding down"). For example, for a target at 950m: zoom in to the optic's highest setting, adjust zero to 800m, and then factor in the holdover, Angle To Target, approximate time/speed, etc. Images provided are from Arma2.com. Data tested as of Arma 2: CO version 1.62.95248



M107

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	0	6.25	952	0.11
150	+1/3	6.09	900	0.17
200	0	5.94	866	0.23
250	+1/3	5.79	830	0.30
300	0	5.65	819	0.37
350	+1/3	5.51	810	0.43
400	0	5.37	785	0.51
450	+1/3	5.24	764	0.59
500	0	5.11	753	0.66
550	+1/3	4.98	745	0.74
600	0	4.86	739	0.81
650	+1/3	4.74	733	0.89
700	+1/4	4.62	729	0.96
750	+2/3	4.51	711	1.05
800	+1/4	4.39	701	1.14
850	+3/4	4.29	689	1.23
900	+1/4	4.18	675	1.33
950	+2/3	4.08	670	1.42
1000	0	3.97	662	1.51
1050	+1	3.88	654	1.61
1100	+2/3	3.78	639	1.72
1150	+1	3.69	636	1.81
1200	+1/2	3.60	621	1.93
1250	+1 1/4	3.51	618	2.02
1300	+2	3.42	610	2.13
1350	+3 1/4	3.33	596	2.27
1400	+4	3.25	586	2.39
1450	+5	3.17	577	2.51
1500	+5 2/3	3.09	572	2.62
1550	+7	3.02	563	2.75
1600	+7 2/3	2.94	560	2.86
1650	+9	2.87	552	2.99
1700	+10 1/3	2.80	542	3.14
1750	+11 1/3	2.73	534	3.28
1800	+12 1/2	2.66	527	3.42

M107 TWS

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	0	6.25	952	0.11
150	0	5.31	900	0.17
200	0	5.08	866	0.23
250	0	4.83	830	0.30
300	0	4.59	819	0.37
350	0	4.37	810	0.43
400	0	4.15	785	0.51
450	0	3.95	764	0.59
500	0	3.76	753	0.66
550	+1/3	3.57	745	0.74
600	0	3.40	739	0.81
650	+1/3	3.23	733	0.89
700	0	3.07	729	0.96
750	+1/3	2.92	711	1.05
800	0	2.78	701	1.14
850	+1/3	2.64	689	1.23
900	0	2.51	675	1.33
950	+2/3	2.39	670	1.42
1000	0	2.27	662	1.51
1050	+1	2.16	654	1.61
1100	+1/3	2.06	639	1.72
1150	+1	1.95	636	1.81
1200	+1/3	1.86	621	1.93
1250	+1	1.77	618	2.02
1300	+3	1.68	610	2.13
1350	+6	1.60	596	2.27
1400	+7 1/2	1.52	586	2.39
1450	+10 1/3	1.45	577	2.51
1500	+12 1/3	1.38	572	2.62



AS50

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	+1/2	31.93	952	0.11
150	+1/2	31.14	938	0.16
200	+1/3	30.37	901	0.22
250	+1/2	29.62	898	0.28
300	+1/3	28.88	895	0.34
350	+1/2	28.17	884	0.40
400	+1/3	27.47	867	0.46
450	+1/2	28.79	847	0.53
500	+1/4	26.13	842	0.59
550	+1/2	25.48	837	0.66
600	+1/4	24.85	829	0.72
650	+2/3	24.24	802	0.81
700	+1/4	23.63	786	0.89
750	+2/3	23.05	782	0.96
800	+1/4	22.48	777	1.03
850	+2/3	21.92	766	1.11
900	+1	21.38	747	1.20
950	+1 1/3	20.85	738	1.29
1000	+1/3	20.34	729	1.37
1050	+2/3	19.83	719	1.46
1100	+1	19.34	711	1.55
1150	+1 2/3	18.86	695	1.65
1200	+1/3	18.39	690	1.74
1250	+3/4	17.94	683	1.83
1300	+1 1/3	17.49	667	1.95
1350	+2	17.06	660	2.05
1400	+1/3	16.64	655	2.14
1450	+1	16.23	642	2.26
1500	+1 1/2	15.82	630	2.38
1550	+2 1/4	15.43	626	2.48
1600	+1/3	15.05	613	2.61
1650	+1	14.68	607	2.72
1700	+1 1/2	14.30	597	2.85
1750	+2 1/2	13.96	589	2.97
1800	+3 1/4	13.61	581	3.10
1850	+4	13.27	573	3.23
1900	+4 3/4	12.94	563	3.37
1950	+5 1/3	12.63	556	3.51
2000	+5 2/3	12.31	550	3.64
2050	+7 1/3	12.00	538	3.81
2100	+8 1/3	11.70	529	3.97
2150	+9 1/3	11.40	523	4.11
2200	+10 1/3	11.13	516	4.26
2250	+11 1/3	10.85	506	4.45
2300	+12 1/3	10.59	502	4.58
2350	+13 1/3	10.33	494	4.76
2400	:)	10.06	486	4.94

AS50 TWS

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	+2	31.60	952	0.11
150	+1	30.06	938	0.16
200	+1/2	28.58	901	0.22
250	+1	27.19	898	0.28
300	+1/3	25.85	895	0.34
350	+2/3	24.59	884	0.40
400	+1/3	23.39	867	0.46
450	+2/3	22.24	847	0.53
500	+1/3	21.15	842	0.59
550	+2/3	20.12	837	0.66
600	+1/3	19.13	829	0.72
650	+2/3	18.19	802	0.81
700	+1/3	17.30	786	0.89
750	+2/3	16.46	782	0.96
800	+1/3	15.65	777	1.03
850	+2/3	14.88	766	1.11
900	+1 1/2	14.16	747	1.20
950	+3	13.46	738	1.29
1000	+1/3	12.80	729	1.37
1050	+1	12.18	719	1.46
1100	+2	11.58	711	1.55
1150	+3	11.02	695	1.65
1200	+1/3	10.48	690	1.74
1250	+1	9.97	683	1.83
1300	+2 1/2	9.48	667	1.95
1350	+5	9.01	660	2.05
1400	+1/3	8.57	655	2.14
1450	+1 1/2	8.15	642	2.26
1500	+3/1/2	7.76	630	2.38
1550	+5 1/2	7.38	626	2.48
1600	+1/3	7.02	613	2.61
1650	+1 1/2	6.50	607	2.72
1700	+4	6.33	597	2.85
1750	+6 1/2	6.01	589	2.97
1800	+9	5.72	581	3.10
1850	+11 1/2	5.44	573	3.23
1900	+13 1/2	5.17	563	3.37
1950	+16	4.92	556	3.51
2000	+19	4.67	550	3.64



KSVK

Range (m)	Chevron	Damage	~Speed (m/s)	~Time (s)
100	1st	8.27	850	0.12
150	1st	8.05	841	0.18
200	1st	7.83	830	0.24
250	bottom of 1st	7.62	822	0.30
300	2nd	7.41	811	0.37
350	2nd	7.21	802	0.44
400	bottom of 2nd	7.01	795	0.50
450	bottom of 2nd	6.82	764	0.59
500	1/2 from 2nd to 3rd	6.63	755	0.66
550	3rd	6.49	739	0.74
600	middle of 3rd	6.28	733	0.82
650	bottom of 3rd	6.11	728	0.89
700	bottom of 3rd	5.94	705	0.99
750	1/2 from 3rd to 4th	5.78	699	1.07
800	4th	5.62	684	1.17
850	middle of 4th	5.47	677	1.26
900	bottom of 4th	5.32	667	1.35
950	1/3 from 4th to 5th	5.18	655	1.45
1000	1/2 from 4th to 5th	5.03	647	1.55
1050	2/3 from 4th to 5th	4.90	634	1.66
1100	5th	4.76	620	1.77
1150	middle of 5th	4.63	611	1.88
1200	bottom of 5th	4.51	601	2.00
1250	top post	4.39	595	2.10



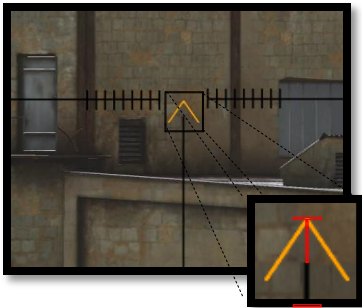
L115

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	+1/3	5.38	952	0.11
150	+1/3	5.25	925	0.16
200	+1/3	5.12	917	0.22
250	+1/3	4.99	906	0.28
300	+1/3	4.86	901	0.33
350	+1/3	4.74	893	0.39
400	+1/3	4.63	866	0.46
450	+1/3	4.51	859	0.52
500	+1/3	4.40	836	0.60
550	+1/3	4.29	822	0.67
600	+1/3	4.19	808	0.74
650	+1/3	4.08	800	0.81
700	+1/3	3.98	786	0.89
750	+1/3	3.88	781	0.96
800	+1/3	3.79	767	1.04
850	+1/3	3.69	756	1.12
900	+1	3.60	750	1.20
950	+1 1/3	3.51	741	1.28
1000	+1/3	3.42	726	1.38
1050	+2/3	3.34	717	1.46
1100	+1	3.26	706	1.56
1150	+1 1/3	3.18	697	1.65
1200	+1/3	3.10	691	1.74
1250	+2/3	3.02	681	1.84
1300	+1 1/3	2.95	677	1.92
1350	+2	2.87	663	2.04
1400	+1/3	2.80	647	2.16
1450	+1	2.73	641	2.26
1500	+1 1/3	2.70	632	2.37
1550	+2	2.68	622	2.49
1600	+3	2.53	615	2.60
1650	+3 1/3	2.51	605	2.73
1700	+3 2/3	2.48	597	2.85
1750	+4 2/3	2.35	589	2.97
1800	+5 2/3	2.29	581	3.10
1850	+6 1/3	2.23	570	3.25
1900	+7 1/3	2.18	563	3.37
1950	+8	2.12	557	3.50
2000	+9	2.07	554	3.61
2050	+10	2.02	538	3.81
2100	+11	1.97	533	3.94
2150	+12	1.92	523	4.11
2200	+13	1.87	519	4.24
2250	:)	1.88	509	4.42



CZ 550

Range (m)	Distance	Damage	~Speed (m/s)	~Time (s)
100	0	1.30	819	0.12
150	0	1.24	810	0.19
200	0	1.18	793	0.25
250	0	1.13	793	0.32
300	0	1.08	763	0.39
350	0	1.03	795	0.44
400	0	0.98	750	0.53
450	0	0.93	715	0.63
500	0	0.89	695	0.72
550	+1/2	0.85	682	0.81
600	0	0.81	655	0.92
650	+1	0.77	642	1.01
700	0	0.74	630	1.11
750	+1	0.70	600	1.25
800	0	0.67	590	1.36
850	+1 1/2	0.64	580	1.47
900	+3	0.61	559	1.61
950	+4 1/2	0.58	542	1.75
1000	+6	0.56	532	1.88



NOTE: Due to the lack of marks on the reticle of the CZ 550 scope, a generic “distance” from the tip of the **ORANGE** chevron to the top of the bottom post is imagined (**RED**). In the same fashion as a mil-dot reticle, this distance is 0 at this orange tip and +1 at the top of the post. Then we virtually repeat this distance down the post to split it up into several virtual segments of that same length.

Employing imagined distances is more natural than you might first believe. Being precise with it will require excellent visual estimation skills, strong muscle memory, and tight control of your character’s breathing. This technique is the only way we can try to extend the effective range of a weapon system with an otherwise unreferenced Y-axis. The CZ550 and accompanying optic is a blast to use, but it will never be as accurate as the other weapon systems for this reason.



CZ 750

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	0	1.35	855	0.12
150	+1/4	1.28	842	0.18
200	0	1.22	833	0.24
250	+1/2	1.17	830	0.30
300	0	1.11	810	0.37
350	+1/2	1.06	783	0.45
400	0	1.01	763	0.52
450	+1/2	0.97	732	0.61
500	0	0.92	723	0.69
550	+3/4	0.88	707	0.78
600	0	0.84	684	0.88
650	+1	0.80	662	0.98
700	0	0.76	644	1.09
750	+1	0.73	625	1.20
800	0	0.70	614	1.30
850	+1	0.66	591	1.44
900	+2	0.63	586	1.54
950	+3	0.60	565	1.68
1000	+4 1/2	0.58	549	1.82
1050	+5 1/2	0.55	536	1.96



M24 & M40

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	0	1.35	855	0.12
150	+1/4	1.28	842	0.18
200	0	1.22	833	0.24
250	+1/2	1.17	830	0.30
300	0	1.11	810	0.37
350	+1/2	1.06	783	0.45
400	0	1.01	763	0.52
450	+1/2	0.97	732	0.61
500	0	0.92	723	0.69
550	+3/4	0.88	707	0.78
600	0	0.84	684	0.88
650	+1	0.80	662	0.98
700	0	0.76	644	1.09
750	+1	0.73	625	1.20
800	0	0.70	614	1.30
850	+1	0.66	591	1.44
900	+2	0.63	586	1.54
950	+3	0.60	565	1.68
1000	+4 1/2	0.58	549	1.82
1050	+5 1/2	0.55	536	1.96



DMR

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	-3	1.22	855	0.12
150	-2 1/2	1.12	842	0.18
200	-2	1.02	833	0.24
250	-1 1/2	0.92	830	0.30
300	-1	0.84	810	0.37
350	-1/2	0.77	783	0.45
400	0	0.70	763	0.52
450	+1	0.63	732	0.61
500	+1 1/2	0.58	723	0.69
550	+2	0.53	707	0.78
600	+2 1/2	0.48	684	0.88
650	+3	0.43	662	0.98
700	+4	0.39	644	1.09
750	+4 1/2	0.36	625	1.20
800	+5 1/2	0.33	614	1.30
850	+6 1/2	0.30	591	1.44
900	+7 1/2	0.27	586	1.54
950	+8 1/2	0.25	565	1.68
1000	+9 1/2	0.22	549	1.82



M110

Range (m)	Ticks	Damage	~Speed (m/s)	~Time (s)
100	0	1.35	855	0.12
150	0	1.28	842	0.18
200	0	1.22	833	0.24
250	0	1.17	830	0.30
300	0	1.11	810	0.37
350	+1	1.06	783	0.45
400	0	1.01	763	0.52
450	+1	0.97	732	0.61
500	0	0.92	723	0.69
550	+1	0.88	707	0.78
600	0	0.84	684	0.88
650	+1	0.80	662	0.98
700	0	0.76	644	1.09
750	+2	0.73	625	1.20
800	0	0.70	614	1.30
850	+2	0.66	591	1.44
900	+4	0.63	586	1.54
950	+5 1/2	0.60	565	1.68
1000	+8	0.58	549	1.82
1050	top post	0.55	536	1.96

M110 TWS

Range (m)	Ticks	Damage	~Speed (m/s)	~Time (s)
100	0	1.35	855	0.12
150	0	1.28	842	0.18
200	0	1.22	833	0.24
250	0	1.17	830	0.30
300	0	1.11	810	0.37
350	+1	1.06	783	0.45
400	0	1.01	763	0.52
450	+1	0.97	732	0.61
500	0	0.92	723	0.69
550	+1	0.88	707	0.78
600	0	0.84	684	0.88
650	+1	0.80	662	0.98
700	0	0.76	644	1.09
750	+2	0.73	625	1.20
800	0	0.70	614	1.30
850	+2	0.66	591	1.44
900	+4	0.63	586	1.54
950	+5 1/2	0.60	565	1.68
1000	+8	0.58	549	1.82
1050	top post	0.55	536	1.96



SVD

Range (m)	Chevron	Damage	~Speed (m/s)	~Time (s)
100	1st	1.30	900	0.11
150	1st	1.23	866	0.17
200	middle of 1st	1.18	850	0.24
250	middle of 1st	1.12	817	0.31
300	bottom of 1st	1.07	789	0.38
350	2nd	1.02	751	0.47
400	bottom of 2nd	0.97	735	0.54
450	1/2 from 2nd to 3rd	0.92	707	0.64
500	3rd	0.88	681	0.73
550	middle of 3rd	0.84	669	0.82
600	bottom of 3rd	0.80	653	0.92
650	1/2 from 3rd to 4th	0.76	630	1.03
700	4th	0.72	612	1.14
750	bottom of 4th	0.69	599	1.25
800	1/3 from 4th to 5th	0.66	588	1.36
850	1/2 from 4th to 5th	0.63	569	1.49
900	2/3 from 4th to 5th	0.60	554	1.62
950	5th	0.57	539	1.76
1000	top post	0.54	521	1.92

SVD NSPU

Range (m)	Mark	Damage	~Speed (m/s)	~Time (s)
100	chevron	1.30	900	0.11
150	chevron	1.23	866	0.17
200	chevron	1.18	850	0.24
250	chevron	1.12	817	0.31
300	chevron	1.07	789	0.38
350	chevron	1.02	751	0.47
400	bottom of chevron	0.97	735	0.54
450	1/4 from chevron to top of 1st line	0.92	707	0.64
500	1/4 from chevron to top of 1st line	0.88	681	0.73
550	1/3 from chevron to top of 1st line	0.84	669	0.82
600	1/2 from chevron to top of 1st line	0.80	653	0.92
650	2/3 from chevron to top of 1st line	0.76	630	1.03
700	3/4 from chevron to top of 1st line	0.72	612	1.14
750	top of 1st line	0.69	599	1.25
800	1/3 down 1st line	0.66	588	1.36
850	2/3 down 1st line	0.63	569	1.49
900	bottom of 1st line	0.60	554	1.62
950	1/3 between 1st and 2nd lines	0.57	539	1.76
1000	1/2 between 1st and 2nd lines	0.54	521	1.92



VSS

Range (m)	Chevron	Damage	~Speed (m/s)	~Time (s)
150	large chevron	2.99	330	0.45
200	1st small chevron	2.78	327	0.61
250	1/2 from 1st to 2nd	2.70	320	0.78
300	2nd	2.57	315	0.95
350	1/3 from 2nd to 3rd	2.45	315	1.11
400	4th	2.33	315	1.27

NOTE: Ranges begin at 150 meters due to the ballistics of the heavier 9x39mm round traveling through the internal suppressor!



Mk17 Sniper

Range (m)	Ticks	Damage	~Speed (m/s)	~Time (s)
100	0	1.35	855	0.12
150	0	1.28	842	0.18
200	0	1.22	833	0.24
250	0	1.17	830	0.30
300	0	1.11	810	0.37
350	+1	1.06	783	0.45
400	0	1.01	763	0.52
450	+1	0.97	732	0.61
500	0	0.92	723	0.69
550	+1	0.88	707	0.78
600	0	0.84	684	0.88
650	+1	0.80	662	0.98
700	0	0.76	644	1.09
750	+2	0.73	625	1.20
800	0	0.70	614	1.30
850	+2	0.66	591	1.44
900	+4	0.63	586	1.54
950	+5 1/2	0.60	565	1.68
1000	+8	0.58	549	1.82
1050	top post	0.55	536	1.96

Mk17 Sniper SD















Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	0	1.23	330	0.30
150	+2	1.17	327	0.46
200	0	1.11	325	0.62
250	+1 1/2	1.05	317	0.79
300	+1/2	1.01	377	0.80
350	+2	0.96	377	0.93
400	+4 1/2	0.91	376	1.06
450	+7	0.87	376	1.20
500	+10	0.83	371	1.35
550	?	0.79	371	1.48
600	?	0.75	371	1.62
650	?	0.72	371	1.75



Mk12 SPR

Range (m)	Mils	Damage	~Speed (m/s)	~Time (s)
100	-2	0.58	980	0.10
150	-2	0.54	833	0.18
200	-2	0.51	817	0.24
250	-2	0.47	801	0.31
300	-1	0.44	775	0.39
350	-1	0.41	735	0.48
400	0	0.38	708	0.56
450	+1	0.35	674	0.67
500	+1 1/2	0.33	646	0.77
550	+2 1/2	0.30	634	0.87
600	+3 1/2	0.28	592	1.01
650	+4 1/2	0.26	573	1.13
700	+5 1/2	0.24	552	1.27

Sidearms

	<i>Unsuppressed</i>		<i>Suppressed</i>	
	Range (m)	Damage	Range (m)	Damage
<u>M9</u> 	50	0.23	<u>M9 SD</u> 	50 0.24
<u>Markarov</u> 	50	0.13	<u>Markarov SD</u> 	50 0.13
<u>PDW</u> 	50	0.24	<u>PDW SD</u> 	50 0.24
<u>CZ 75 Phantom</u> 	50	0.23	<u>CZ 75 Phantom SD</u> 	50 0.24
<u>CZ 75 Duty</u> 	50	0.23		
<u>CZ 75 Compact</u> 	50	0.23		
<u>G17</u> 	50	0.21		
<u>1911</u> 	50	0.24		
<u>Revolver</u> 	50	0.24		
<u>Sa-61</u> 	50	0.08		

TARGET IDENTIFICATION
APPENDIX 3A

NOTE: The following sections document soldiers and equipment belonging to the Takistani Army to illustrate the key characteristics of their appearance and loadouts to aid in identifying each type in the field.

Infantry



Sniper KSVK



Spotter



Rifleman RPG-18



Rifleman RPG-7



Pilot



Officer



Commander



Crewman



Grenadier



AT Specialist



AA Specialist



**Automatic
Rifleman**



**Assist AT
Rifleman Front**



**Assist AT
Rifleman Back**



Rifleman



**Special Purpose
(*face covered*)**

Static Weapons



ZU-23



D-30



KORD Mini Tripod



KORD



Podnos 2B14



AGS-30



AA Igla Pod

Vehicles



Ural ZU-23



UAZ DShKM



UAZ AGS-30



Military Off-Road SPG9



Military Off-Road M2

ANGLE TO TARGET CALCULATION

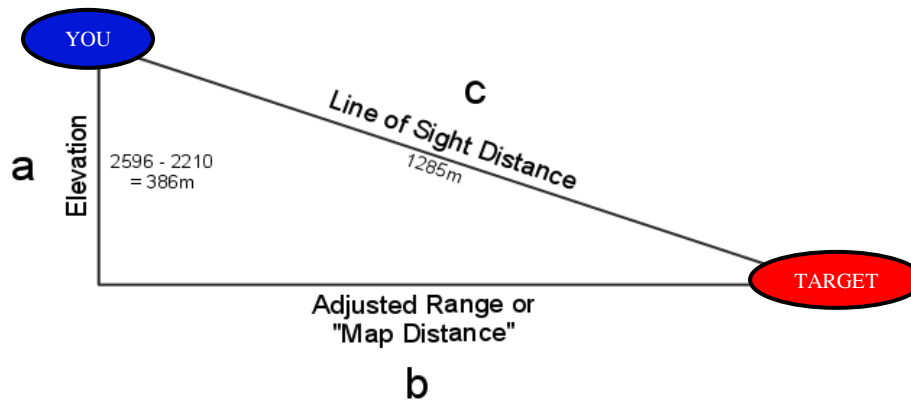
APPENDIX 4A

The Angle To Target calculation is fun and simple to understand once you have applied it in the field; do not let the math scare you! Due to the nature of a bullet's trajectory, as you increase the difference in elevation between you and your target, the actual distance your bullet will travel in an arc must meet your zero range to hit the location you are aiming. With that said, a triangle is formed between you, your target, and the difference in elevation.

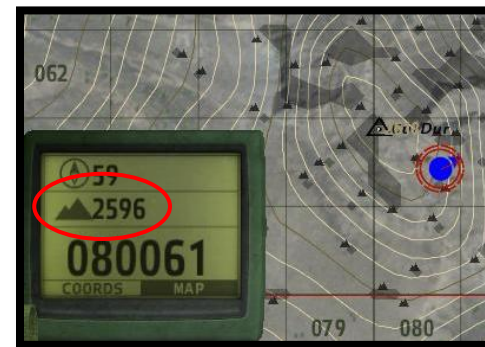
The three (3) variables you must determine before doing any calculations include:

- Line of Sight (LOS) distance or range viewed with a range-finding optic
- Your Elevation
- Target Elevation

NOTE: The Android application available for download puts this manual at your fingertips. It can help you calculate the Distance To Target of your shots.



Line of Sight (LOS) distance showing 1285m.



Using the GPS, your own elevation reads 2596m.

Let us begin factoring in the Angle To Target of this shot. First, we determine the distance to the target with the Rangefinder (image above). The HVT is ranged at 1285m. That is our Line of Sight (LOS) distance, or the value of variable 'c' on the triangle above.

Next, we find our current elevation by opening the map and reading the value next to the mountain icon on the GPS screen. In the image above, the GPS displays 2596m.

Now we are going to need the *difference* in our elevation for the value of 'a' – read the map's terrain for this: the road the building sits on is at an elevation of 2203m. The HVT is located on the 3rd story of a building so we will add about 7m to that for a target elevation totaling 2210m. Now, we subtract 2210m from 2596m and end up with 386m as the elevation difference, our value for side 'a' of the triangle.

From mathematics we know the Pythagorean Theorem formula: $a^2 + b^2 = c^2$
 To solve for 'b' we algebraically manipulate this to find that: $b = \sqrt{c^2 - a^2}$

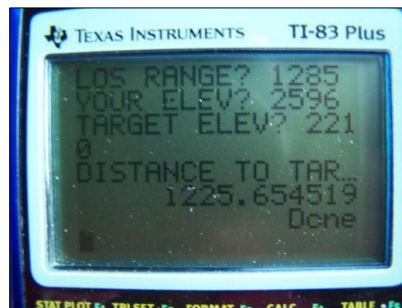
The calculation:

given: $c = 1285$
 $a = 386$

$b = \sqrt{c^2 - a^2}$

$b = \sqrt{1285^2 - 386^2}$

$b = 1225.6 \text{ m}$

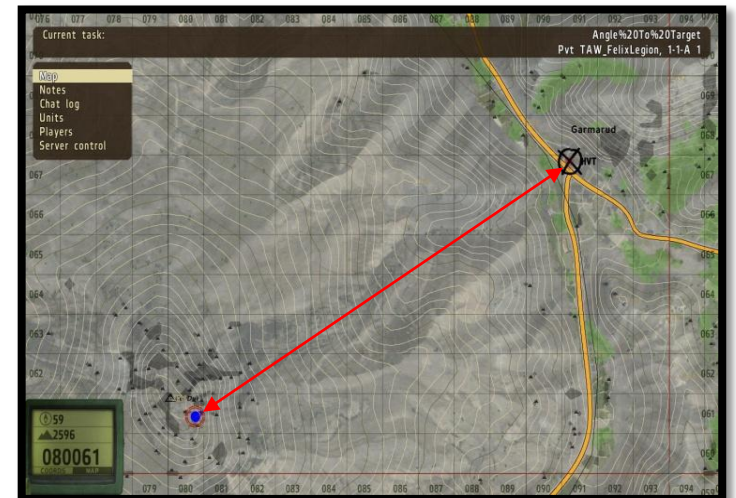


A calculator programmed with the formula.

We find that the Distance To Target to zero for is 1225m, a significant 60m difference from the 1285m viewed LOS with the Rangefinder – enough that possibly would have equated to a missed one shot one kill! Now, you are ready to fire.



From the road, the elevation the building is at is 2203m. Let us add about 7 meters to account for the height of the building he is standing on, so that gives us 2210m.



The Distance To Target, or actual map distance, calculates to 1225m and is the range you want to base your zero on.

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CHANGELOG

The SOM v2.0 – 3/6/14

- Numerous sentence, format, and grammar changes
- Redesigned formatting, fonts, and color schemes to improve readability and increase printability
- Added Table of Contents as links for finding information faster
- Added Glossary featuring common terms
- Added more content to chapters: Map and Navigation, Spotting and Target Detection
- Added a new chapter on Loopholes
- Added Weapon Range Charts in appendix
- Added/revised content to bring it in line with the full Combined Operations game

The SOM v1.0 – 10/13/10

- Published and released to the Arma community