Welcome to the ArmA 2: Operation Arrowhead Sniper Operations Manual. This manual covers all aspects of being a sniper in ArmA 2: OA. Moreover, this document offers greater insight for those who want to understand the role and way a sniper thinks and operates – how they provide a unique skill set to benefit the team. The Sniper Operations Manual, hereafter referred to as The SOM, is the precursor to an advanced sniper training course.
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INTRODUCTION

The SOM was written for The Art of Warfare’s ArmA 2: O.A Division. In an effort to give aspiring snipers the references and information needed to be true master’s of the craft, we hope it also inspires and excites these players who constantly strive for improvement and never stop learning; as we have done so ourselves in the writing of this. To be called a sniper it takes more than just being able to pick up a sniper rifle and shoot targets at long range. Being able to shoot is only a very small part of what it takes to be an effective sniper on the battlefield.

There are two kinds of shooters: marksman and snipers. Let’s briefly look at the differences. A marksman, though adept at hitting his targets with extreme accuracy, lacks the overall battlefield awareness and field craft a sniper has. A sniper element has the advantages of assembling and deploying quickly, often undetected. When on the ground they can relocate fast while a marksman has a specific duty to the squad in extending their range. The recon and intelligence gathering a sniper element can provide enables command to extend the coordination of forces far beyond the map and becomes their window to how the enemy forces are reacting. Both have an important role to play in ArmA 2: O.A and the differences should be understood so as to never blur the lines, only utilize each to their fullest, thus enhancing the entire team.

ArmA 2: O.A affords us military enthusiasts the luxury of treating the game as realistic as we want to make it. That is what has been done here. We have tried to cover every angle possible and take it a level above where most would go; a goal we tried to achieve remembering to make it the most realistic experience we could. In doing so, we end up with something that can be picked up by anyone. It is our hope that everyone finds something useful that benefits their game at whatever level you come from and hope to go. It comes down to the fact that those who put in the time to use and learn from this manual will be the ones that get the most out of it.

What makes a good sniper?

A good sniper must be a team player. There is a preconceived notation that a sniper is simply a lone wolf out there just getting kills for themselves. This is not the case here. To those players we would not award them by name of a sniper. The sole purpose of a sniper is to be an asset to his team by providing them fluid battlefield intelligence and surgical precision fire when needed. Due to the variety of missions a sniper can be called upon to perform they absolutely must be able to “Improvise, Adapt and Overcome”. They must be able to adapt to the dynamic battlefield, improvise to gain the advantage, and overcome the adversities threatening their effectiveness. A sniper should continually strive to become perfect at their craft by acquiring knowledge after every engagement and using that knowledge to enhance their skills and abilities. Truly ghosts of the battlefield. Neither seen nor heard until the precise time they choose to make themselves known.
The sniper team’s organization is simple. It consists of two men: a sniper and a spotter. Don’t let the wording fool you both men are trained well in sniping. There are certain situations which the sniper will have to operate alone which means he has no spotter and takes on all roles. In the same way the spotter must learn to fire as effectively as the sniper every now and then. However, operating in two man teams gives them the greatest flexibility and lethality on the battlefield. For the team to successfully survive on the battlefield they must move, act, and communicate as a single entity.

**SNIPER DUTIES AND RESPONSIBILITIES:**

- Selects Sniper Hide Location to fire from
- Plans exfiltration route
- Adjusts scope for range and angle
- Engages human and materiel targets of priority
- Observes and relays information with spotter

**SPOTTER DUTIES AND RESPONSIBILITIES:**

- Identifies targets by priority
- Makes range estimates for sniper
- Relays high priority intelligence and coordinates with command
- Provides close-range security and takes point when moving
- Engages targets below the “horizon line” as appropriate to mission

The sniper team’s role is twofold. First and foremost, they are shooters capable of delivering deliberate surgical precision long-range fire out to 1200m and beyond. This allows the sniper to eliminate key targets on the battlefield anywhere, day or night, under any conditions. The motto is ONE SHOT ONE KILL. Secondly, what some may argue to be just as important as the first is surveillance and intelligence reporting. The battlefield is an active and changing landscape and a sniper is vital to the command structure for relaying the information that is developing on the battlefield.
**SNIPER TEAM EQUIPMENT**

In ArmA 2: OA there is a vast number of weapons, most with some type of optical enhancement. In most cases a sniper will carry a scoped-equipped weapon over an aimpoint, holographic, or ACOG sight. These types of sights will not give the sniper the magnification to hit targets accurately at range. 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, they must adjust their load out for the task they are given.

It is encouraged for a sniper to familiarize themselves with all weapons. When your primary weapon runs dry you might be forced to pick up weapons or equipment off of enemy soldiers. Or you might just be left with your pistol; there are many different situations that can happen. You must also know your limitations with your weapons. For example some weapons are equipped with the TWS sight. This scope is designed to pick up heat signatures which work really well for picking out enemies on the battlefield at night or even during the day.

However, the magnification is reduced hampering the sniper’s ability to engage extreme long-range targets. Picking a weapon with this sight when having to engage targets at 1200m consistently would be a poor selection. You must know the limitations of the weapon when selecting it and be able to handle it most effectively.

There are numerous different types of weapons and equipment that a sniper can use to accomplish their given mission. It is up to the sniper and spotter to select which weapons will best fit their situation and coordinate amongst themselves on who will be taking what. Each should know exactly who is carrying what before they deploy to the AO. This will cut down on chatter later with questions like “do you have this or that?”. You should already know all equipment that will be available to you in the field. Some equipment that is common in a sniper-spotter load out is as follows:

**Smoke Grenades:** These guys 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 can be used to screen the enemy from an injured friendly unit or if you must egress under fire. It also helps when you want to mark enemy locations so friendly can engage.

**Laser Designator:** Snipers are the eyes and ears of the battlefield so when a FAC (Forward Air Controller) is not available it might be necessary for a sniper to carry the Laser Designator to spot for friendly air support. NOTE: when you select this item you must have at least one slot available for a battery or it cannot function.

**Grenades:** Standard fragmentation grenades work well for groups of soldier or when clearing out interior rooms in buildings.
**Satchel Charges:** All purpose demolition charges. They work to take out radio towers, sabotage enemy supplies and emplacements, and could be a last resort of defense for vehicles. Satchels can be detonated up to about 300m and even while in a vehicle.

**Backpacks:** You may have the option of having a backpack. This allows you to carry more items or an extra weapon. This will take up your secondary weapon slot in your gear screen. It also does not allow you to carry large weapons like the M107 or anti-tank varieties. The M107 system, if equipped, removes the space of the secondary weapon slot. The backpack is helpful in extended engagement when you can’t get back or don’t have time to return to base and rearm or refit.

**Binoculars:** The binoculars can be helpful in certain situations. They give the user a wide field of view larger than that of the rangefinder but do not provide range distances. It’s most useful when having to scan vast areas quickly.
SNIPER SYSTEMS:

In ArmA 2: OA there are some new sniper rifles and some old. They have also included some assault type weapons with TWS optics which gives the sniper even greater flexibility in close engagements. This section will give an overview of the capabilities of each sniper rifle and provide characteristics such as their effective range’s, zeroes, available optics, ammunition, etc.
The first weapon covered is the M107; this Sniper system is built for long-range engagements. It uses the .50cal cartridge and is by far the best anti-material sniper system. The M107 is a semi-auto rifle with a 10 round magazine making fast repeat shots possible with little delay. This rifle can engage targets out to a maximum zero range of 1200m and even strike targets further than this using the hold over method. Its heavy round has the best result for taking down targets with one shot. Being anti-material, damage can still be dealt through thin metal walls and also against enemy helicopters. Overall the M107 is a very balanced sniper system, though a little loud, best to be shot at a distance. This sniper system is very capable out to 1500m, and max's out at 1800m. To achieve the 1500m shots you must guess using the thick black line. The hold for 1800m is at the very bottom of the black line.

**RIFLE SPECIFICATION**

<table>
<thead>
<tr>
<th>Rifle</th>
<th>Max Zero Range</th>
<th>Max Hold Over Range</th>
<th>Max Effective Range</th>
<th>Magazine Capacity</th>
<th>Muzzle Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>M107</td>
<td>1200m</td>
<td>1800m</td>
<td>1500m</td>
<td>10rds</td>
<td>850mps</td>
</tr>
<tr>
<td>M107 TWS</td>
<td>1200m</td>
<td>N/A</td>
<td>1000m</td>
<td>10rds</td>
<td>850mps</td>
</tr>
</tbody>
</table>

**BALLISTIC TABLE**

<table>
<thead>
<tr>
<th>Range</th>
<th>1300m</th>
<th>1400m</th>
<th>1500m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mil-Dots</td>
<td>2 mils</td>
<td>4 mils</td>
<td>6 mils</td>
</tr>
</tbody>
</table>
If there was a standard from where all other sniper rifles are measured the M24 would be it. It is a very versatile sniper system shooting a 7.62mm cartridge. Bolt-action, it operates with a capacity of 5 rounds, making it a little slower than competing semi-auto rifles but retains a cycle rate still very fast. The M24 has a max zero range of 800m, however, with practice a skilled shooter can obtain kills out to 1400m. With this rifle system, targets can be engaged at medium to long-range. The effective range of this rifle is 800m and by using the mil-dots you can easily do repeat shots at that distance. Even though you can reach out to 1400m it is unreliable and engaging at this range should only be used if absolutely necessary. The 7.62mm round loses the effectiveness to bring down your target in one hit very quickly when engaging past 800m.

### RIFLE SPECIFICATION

<table>
<thead>
<tr>
<th>Rifle</th>
<th>Max Zero Range</th>
<th>Max Hold Over Range</th>
<th>Max Effective Range</th>
<th>Magazine Capacity</th>
<th>Muzzle Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>M24</td>
<td>800m</td>
<td>1400m</td>
<td>800m</td>
<td>5rds</td>
<td>900mps</td>
</tr>
</tbody>
</table>

### BALLISTIC TABLE

<table>
<thead>
<tr>
<th>Range</th>
<th>900m</th>
<th>1000m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mil-Dots</td>
<td>2 mils</td>
<td>4 mils</td>
</tr>
</tbody>
</table>
The M110 is a unique sniper system. Sharing the 7.62mm magazines with the Mk17 models it’s a semi-automatic rifle whose scope has night vision capabilities. It is the only sniper system that offers the same scope featuring NV. The second version of the M110 brings the addition of a TWS (Thermal Weapon Sight). With this optic you get a thermal view through the scope as either white hot or black hot. It is a solid sniper system giving a great selection of optic choices to fit your battlefield situation. Both versions have a maximum zero range of 800m further with the hold over method. Note: the M110 Ballistic table is calculated based on the minimum magnification of this rifle.

**Rifle Specification**

<table>
<thead>
<tr>
<th>Rifle</th>
<th>Max Zero Range</th>
<th>Max Hold Over Range</th>
<th>Max Effective Range</th>
<th>Magazine Capacity</th>
<th>Muzzle Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>M110 NV</td>
<td>800m</td>
<td>1300m</td>
<td>800m</td>
<td>20rds</td>
<td>900mps</td>
</tr>
<tr>
<td>M110 TWS</td>
<td>800m</td>
<td>N/A</td>
<td>800m</td>
<td>20rds</td>
<td>900mps</td>
</tr>
</tbody>
</table>

**Ballistic Table**

<table>
<thead>
<tr>
<th>Range</th>
<th>900m</th>
<th>1000m</th>
<th>1100m</th>
<th>1200m</th>
<th>1300m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mil-Dots</td>
<td>.5 mils</td>
<td>1.5 mils</td>
<td>2.5 mils</td>
<td>3.5 mils</td>
<td>4.5 mils</td>
</tr>
</tbody>
</table>
The Mk17 is another extremely adaptable sniper system that is based off the SCAR battle rifle. The Mk17 comes in three tastes. First is the standard rifle that is capable of semi-auto firing with the 7.62mm round. With a maximum zero range of 800m it can still hold its own against the purpose built sniper systems.

The second comes in the form of a suppressed Mk17 with the standard mil-dot optic. The maximum zero range on this sniper system is 300m, far less than any other sniper rifles. The range reduction is attributed to slower velocity and pressure of the SD rounds its compatible with. The third Mk17 variation is combination suppressed and TWS; giving it a maximum zero range of 300m with the advantage of spotting thermal signatures.

**Rifle Specification**

<table>
<thead>
<tr>
<th>Rifle</th>
<th>Max Zero Range</th>
<th>Max Hold Over Range</th>
<th>Max Effective Range</th>
<th>Magazine Capacity</th>
<th>Muzzle Velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mk17</td>
<td>800m</td>
<td>1500m</td>
<td>800m</td>
<td>20rds</td>
<td>900mps</td>
</tr>
<tr>
<td>Mk17 SD</td>
<td>300m</td>
<td>600m</td>
<td>300m</td>
<td>20rds</td>
<td>350mps</td>
</tr>
<tr>
<td>Mk17 TWS/SD</td>
<td>300m</td>
<td>N/A</td>
<td>300m</td>
<td>20rds</td>
<td>350mps</td>
</tr>
</tbody>
</table>

**Ballistic Table**

<table>
<thead>
<tr>
<th>Range</th>
<th>900m</th>
<th>1000m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tick-Marks</td>
<td>3 ticks</td>
<td>8 ticks</td>
</tr>
</tbody>
</table>
The Mk16 is not really a sniper system but does have an option for TWS equipped rifle. If you need to provide extremely close support to friendly troops this is a good choice. At this point I must note that any type of optic equipped assault rifle for close quarters support is a viable option. When operating at extremely close quarters a rifle with increased magazine size and low magnification optics such as aim-points, holographic and ACOG sights are the better bet.
Using a Sniper Scope

Chapter 2

Mil-Dot Reticle

The mil-dot reticle is the standard for most of the sniper rifles and, as well, there are others that will also be covered. The mil-dots are a versatile tool in the snipers arsenal; it can be used to range targets in a pinch. It also gives extra elevation adjustments when shooting past a sniper systems weapon range. For example, the M24 as you can see below has 10 mil-dots from top to bottom of the thick horizontal and vertical lines. Each mil is equivalent to 50m of elevation. Each rifle has its own unique hold over adjustment.

So for example you have a target that is 650m and you zero for 700, you would aim 1 mil higher than your target. This will give you the extra 50m needed to impact him where you want. You can adjust your weapons zero by using the default keys ("Page Up") to increase zero and ("Pg Down") to decrease zero. Adjustments are in increments of 100m.
The Mk17 doesn't use a mil-dot scope it uses a P4 type scope. It has tick marks instead of mil-dots. This scope is used basically the same way to adjust zero range using the same keys. You'll notice it has many more hash marks in the scope which you can use to fine tune those elevation adjustments. There are 3 different varieties of this sniper system. The Mk17 Sniper uses the P4 reticle. The Mk17 Sniper SD uses the mil-dot reticle and the Mk17 TWS uses the thermal scope.
The SVD/KSVK has the same PSO-1 type reticle and is unique in the fact that you are unable to adjust your zero with these weapons. They also have a built-in rangefinder in the reticle of the scope. By simply putting your target within the graph you will get the range to target. Not as accurate as a laser rangefinder and takes practice, but it works in a pinch. Since there is no elevation adjustment you must use the chevron for your elevation adjustments. This method in conjunction with no zero, your ability to land repeat shots and hit moving targets becomes very unpredictable.
There are a couple of night vision equipment choices for a sniper system. The SVD and some other assault rifles do have this capability. However, the M110 is the most versatile as it has the ability to switch from a day optic to a night vision optic. You can switch between the two by using the default ("N") key; this will switch between day and night modes. Also, when in first person this key will activate your night vision goggles.

View as seen through a Night Vision scope.
The thermal weapon system or TWS adds a new layer of versatility to the sniper’s arsenal. A rifle that is TWS equipped can see both day and night equally well. It picks up thermal signatures so you don’t keep the clarity as you would in some of the other sniper optics. You do get two different versions of this optic; White Hot or Black Hot. You can switch between the two by using the default (*N*) key. Neither view is particularly better than the other but it does of course allow you to visually acquire targets extremely quickly.
A key weapon in the arsenal of the sniper is an ability to stay hidden. They achieve this by maintaining a low profile and employing camouflage techniques. However, it becomes necessary to know how to get in and out first. 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 individual sniper in addition to your partner as you move from location to location, accomplishing objectives. We first begin by discussing the procedures of navigation and map reading, crucial factors to your planning and knowledge of the area before you drop in.

**MAP READING AND USE**

The map of the area you are working in is your primary intelligence when it comes to directions, elevations, coordinates, and other terrain information. Wherever you are operating it is vital that you have a grasp on how to bring up the map and GPS ([key “M” and “Right CTRL+M” by default respectively](#)). It is all you have for information before you hit the ground. Knowing how to read and interact with this tool is necessary to your success and the success of your team. For the player taking on the role of the spotter, the map will most likely be accessed quite often to evaluate locations prior to moving and identifying targets before shooting. It also serves to illustrate in real-time all the maneuvers of the rest of the team effort.

Some important topics relevant to the mission of the sniper:

- Elevation
- Topographical Surface
- Grid Distance and Coordinates
- Symbols
- Compass
Elevation, or the height of the terrain, is designated by 4 brown numbers (black on the “parajump” map) and whose detail 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. At the center of the map you can see the elevation of that mountain shows 2624m and the landform gently slopes down to an elevation reading 2609m to the Northeast.

The topographical surface is a detail that you may already be somewhat familiar with. These are the lines molded around mountains, forests, and roads and can be thought of as a 2D depiction of a 3D surface. Notice that in addition to the lines and shapes showing the topography of this area, you can also see the location of thick vegetation, trees, rocks, buildings, roads. All of these things may be second nature to you but the contour and cover of not only your Sniper Hide Location (SHL) but that of your enemy can not be overlooked. Not knowing if there is a higher mountain in front of your drop point will likely add more time to getting you setup and on scope over an appropriately sized sector.
Shown in the map above is an active AO, shaded in red. At the more functional levels of zoom being more closeup, fine grey lines will appear as a grid. 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. What is more, on the outside of the map are grey numbers and using the standard X axis numbers then Y axis numbers we can develop coordinates for each box. For example, the SHL marked on the map lies in grid (067, 108) and is about 600m away from the center of the AO.

The coordinate system is definitive, however, not very quick or efficient and therefore shouldn’t be relied upon too much for general navigation. The time it may take for your listener to translate 6 numbers to a position on the map can be done faster with the use of symbols or them simply looking at your name on the map, if applicable of course. Symbols 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 the available symbols to find the most appropriate one to use.

When a target needs to be called quickly that is in an obscure direction, the compass is your best choice. Activated by the default key (“K”), and (“2xK”) to toggle, this device has 360 degrees that can provide an immediate bearing to your partner to focus them on the right direction.
This section will focus on the stances your player can use to move and how they may be employed for various situations; these will be the Standing Run, Standing Sprint, Crouch Run, and finally Crawling. The speed and profile of each posture are key factors that each will be evaluated on. An important note to add is that by default, double-tapping the (“Left Shift”) key can activate the slow version of the standing, crouching, and prone stances. This function is great for stalking with controlled speed without sacrificing your breath at all.

**Standing Run**

The standing run is simply done by holding down the (“W”) key and offers the fastest way to move while not 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.

**Standing Sprint**
This is the fastest way to move and is done by default through the double tapping of the ("W") key. Due to its inherent nature it is only advisable to do in a non-threat area or when you need to egress quickly out of fire at the expense of your concealment. Though your profile when moving this way is easily spotted, you do not necessarily make yourself easy to hit. Don’t expect to quickly hit medium to long-range targets accurately after sprinting.

Crouch Run

The crouch 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 doesn’t affect your breathing game if you stumble upon an enemy you can easily drop to a knee or prone and engage with precision. From this position, when the key for fast forward is pressed you immediately break to a standing sprint.

Crawling

Crawling should be activated when you cannot afford to have a tall profile such as when taking cover behind low rocks/walls and to avoid being silhouetted against the horizon of a hill. Clearly this method moves the slowest but allows you to snap directly into the ideal body position so as to maintain your greatest accuracy for long-range engagement. Crawling minimizes the chance of your enemy spotting your move, however, leaves you slow and vulnerable to fire.
One of the core competencies of a sniper must be not just great accuracy and precision when shooting, but other factors that contribute to this feat. These generally include, among some others, personal concerns such as patience and control. The sniper must have a strong knowledge of his own perspective and situation, far beyond just what he or she sees through his scope. The formula for great marksmanship skills lies first in managing your personal stance and breathing pattern and then applying knowledge of what is read through the scope.

**STANCES**

The sniper utilizes all stances depending on the situation – sometimes you will be required to move fast and other times at an extreme crawl – after all of which you should know how to regain your ability to shoot well. In this way, it's important to have control over the things that affect you and the patience to know the limits of what is possible at the moment. Just as your stance affects how you move, each stance has pros and cons to your shooting result. Much of this will come across as common sense but a brief visual comparison should help the pattern of your knowing it become second nature in the field.

The table below features close estimate of the amount your reticle will move around. It should be noted that the lower stance steadiness can be achieved through holding your breath in a higher stance. The prone position with a held breath maintains a near still reticle.

<table>
<thead>
<tr>
<th>Standing w/o Holding Breath</th>
<th>Crouching Holding Breath</th>
<th>Prone Holding Breath</th>
</tr>
</thead>
</table>

![Stance Comparison Diagram](image-url)
BREATHING CONTROL

Here we offer some short notes and statistics that help understand breathing control. Being aware of these will help you to understand how the system works and grow stronger in managing your breath. Slow is smooth, smooth is fast.

- You can hold your breath on average for a max of 11 seconds. After this point you must catch your breath taking approximately 3 seconds.
- The amount of time to catch your breath is related to how long you have held it for.
- Using the Naked-Eye Zoom will hold your breath at the same time if they are mapped to the same key. Likewise, for the additional zoom on the M107.
- You can never run out of breath while in the crouch or lower stances, as well as the any slow version of movement.
- Though the farther you sprint will progressively affect your steadiness, running approximately 100m or more will cause you to become winded and holding your breath does little to steady the reticle.
- A very long sprint of several hundred meters affects your breathing until approximately 60 seconds passes once you are stopped. You finally return to a normal level and can steady the reticle by holding your breath. Be aware of the need to slow your movement for this duration after a long run and before you expect to shoot from your Sniper Hide.
- After taking any small amount of damage, your reticle will fluctuate so severely it makes the job of the sniper incredibly difficult. Egress to a safe location and heal to restore your ability to hold steady.

SHOOTING STATIC TARGETS UP TO 300M

Holding on a target up to 300m requires at least one but often two adjustments.

A target is spotted through the rangefinder at 252m.

First the sniper rifle must be zeroed in to the right range. Since it is more correct to hold over a target, the zero should be set to 200. Zero is adjusted by using the default keys “Page Up” and “Page Down” for higher and lower zero-distances respectively. It may prove useful for the dedicated player who finds themselves in the sniper role often to bind
these to buttons more comfortable and quick location. The second step is to mentally adjust for the distance that you’re not zeroing to.

Because the target distance is not that great, it will typically be unnecessary for you to calculate or think about angle to target, the actual distance the round will travel based on your and the target’s difference in elevation. If you cannot afford to miss, as in a one shot one kill scenario, the angle to target discusses later in this manual should be calculated and compensated for.

With the sniper rifle now zeroed, the reticle should be held over the target appropriately.

**SHOOTING STATIC TARGETS AT 300 - 1200M**

A target is spotted reading a distance of 701m, on a similar elevation level.
Shooting at longer ranges requires no real difference in technique; however, depending on the sniper rifle system you are equipped with, you may need to apply the hold over method discussed above. And due to the increased distance, you would further encounter a large Time to Target and reduced force or damage of your round. For example, striking targets at 900 – 1000m is possible with the M24 even though these distances are past its zero range and namely far from its effective range. Expect to go through quite a few rounds before it’s honed as well as more than just one 7.62 round to get the job done. Nevertheless, practice is the name of the game here; growing your experience with different sniper rifles and their optics as well as different and changing target behavior. The more challenging shots you can tackle with confidence the better prepared and more expansive the palette of shots you’re capable of becomes.
As you all know by now, most sniper systems have a zero range. When using the zero adjustments and taking all other variables into account your Point of Aim (POA) will be in the center of your crosshairs. The standard 7.62mm round sniper systems have a zero range of 800m which is a decent distance. The 12.7mm (.50cal) round in the M107 can reach out to a 1200m zero, 400m beyond that of most sniper rifles. This gives the edge to M107 to engage long range targets. Since ArmA 2: OA uses a realistic ballistic system that 1200 meters is not the furthest distance you can engage.

You can employ the hold over method which uses the thick black lines to get the necessary holder over for the range you need. If you look at the below image you can see red dots these are not exact but they are close enough to give you the idea. You must imagine your mil-dots traveling down the length of that black line. By using this method you can engage targets out to 1800m that’s more that’s twice that of the 7.62mm sniper systems. However, a problem arises by doing this hold over method. You can’t see those extra mil-dots so frankly it turns into a guessing game. When you engage targets using the mil-dots to get extra range it is repeatable since you can see the mil-dots. In the cases where you go past those, you’re guessing and it grows extremely had to make repeatable shots. You should practice doing this to become familiar, though, it should only be used if absolutely necessary out in the field. This holds true for any sniper system where you want to gain extra range.
**MOVING TARGETS**

When trying to engage moving targets in AmrA 2: OA we find it an extremely difficult task and should be done sparingly, as not to give away your position because of missed shots. It takes a very skilled sniper to achieve hits on moving targets at great distances. There are a few things that come into play when shooting at a target at...let’s say 800m:

**Distance to Target:** Your distance to target is important because AmrA 2: OA bullets each have velocity to them. Which means at distance there is actually bullet travel time to take into account; it could take up to a 1 sec or more for a bullet to reach its target taking lag into account as well. So trying to hit a target that is in a full sprint without accounting for bullet travel time will result in a miss. This is one variable you need to account for by leading the target further.

**Angle to Target:** Your angle to target is also very important, not so for leading, but having the right elevation adjust meant. The higher your elevation the higher your bullet impact will be. Even if you’re zeroed for 800m if you’re shooting at a much higher elevation your bullet strikes will be higher than your target. You can either aim lower than you normally would but that is more of a guess that might work for the situation. A more accurate way to calculate this is to use the horizontal distance on your map to find the correct distance. Because the bullet is travelling in an arc is the reason you see this change. When you miss a shot and you confirmed all other variables for it, Angle to Target is probably the thing affecting you and you’ll know it then. See appendix 3A.

**Target Speed:** This is pretty self-explanatory. Targets move at different speeds. They can be casually walking which means their speed is low and your lead shouldn’t be as great. However, if they are running at a full sprint then your lead should be much greater. You also might have to hit crawling targets so all the principles still apply. It takes a great amount of practice and often several shots to achieve hits at faster speed.

**Target Angle:** Target angle is the last of the variables you’ll need to account for. If your target is moving from left to right at a 90 degree angle you’ll have a greater lead. If your target is moving at an angle coming to you or away from you, your lead will slowly get less. When the target is running directly at you or away from you there is no lead but you have to adjust for increasing or decreasing distance.

To achieve the desired hit after taking into account all the variables to hit a moving target you’re left with two methods to engage the target:

**Trapping:** is pretty simple and your scope is not moving all over the place and works if you know the direction your target is heading. You put your scope in the direction of your targets travel and wait for them to hit the necessary amount of lead before you shoot. This method, your reticle is still and your target essentially walks into the bullet.

**Tracking:** is more suited when your target’s direction of travel is erratic. You use your scope to track the targets position and while your scope is moving leading the target you add the necessary lead to make the shot.
As a sniper you have the capability to engage targets with surgical precision. When targeting an enemy you want your shots to be either in the torso (RED) or the head (GREEN). This in most cases will give you the one shot kill you are looking for. It is possible and does happen on occasion where you get a kill by hitting an enemy in the arm or leg. These, however, are not guarantee and should be considered an act of chance. Your goal is to make sure your first shot is the absolute best shot that gives you the highest probability to take your target down in one hit.

To achieve a head shot at great range is very difficult for a couple of reasons. First, your target area is very small which makes it difficult to hit at long ranges. Without a doubt your breathing must be under control to hold steady enough to make this and most shots. Secondly, your distance adjustments have to be spot on, the slight under or over compensation will either be a miss or a shot lower than you want it. You should be practicing to make head shots at long range, sometimes it may be the only part of the soldier that is showing. Your team is counting on you to have the skills necessary to make that difficult shot when the times comes.
Anti-Material

The sniper systems that use the 12.7mm round are Anti-Material systems. The round is designed to punch through armor. This round is not effective on every vehicle only a select few, for the time being. The two that are the most vulnerable are soft targets like jeeps and helicopters with more thin metal and either open air or semi-bullet proof windows.

When it comes to jeeps the 12.7mm round can punch threw doors and windows, killing the occupants inside. Which is one way to to disable a vehicle. However, you have another option afforded to you by shooting at the tires. When a tire is destroyed the vehicle becomes undrivable and subsequently the crew will be stuck unable to move or just simply choose to abandon the vehicle.

The helicopter is much more difficult to hit as it is usually moving at a high rate of speed. It is possible, though, to disable the helicopter by two methods. The first and the largest of the targets is the engine (green). It usually can be disabled with the help of a couple of rounds; which is something to take note of when engaging. You need to be in a good position as you will be shooting multiple times so you’ll need to take care. The second is some of the most difficult shooting you will be doing; the other vulnerable areas are at the rotors (red). Depending on your precision, it can take one or more shots here as well to fully disable the helicopter.
There is no question that snipers are some of the best marksmen on the battlefield. You can have all the marksmanship abilities you want but if you can’t find your target those skills are worthless. Inherently soldiers on the battlefield try to move undetected thus making the snipers job of locating them much more difficult. It is this reason that spotting and target detection are such important skills that a sniper unit must have in order to be successful on the when deployed.

As a sniper or spotter you can’t make the mistake of looking for silhouettes or you will miss the smaller queue’s of an enemy’s presence. There might be times you can only see a leg, arm, or barrel of a rifle. You must train yourself to look for indicators of an enemy’s presence that aren’t in the usual shape of a man.

There are three Optical Systems that a sniper/spotter unit should make use of when in the field.
OPTICAL SYSTEM ONE: NAKED-EYE ZOOM

The naked eye zoom is particularly useful for giving the sniper/spotter a wide viewing angle. Allowing the unit to see as much of the battlefield as possible with an added level of zoom. This is known as a hasty scan its best employed when approaching or when you first enter your AO. You can quickly distinguish possible threats and help determine where you will start with your detailed scanning. You can use this by (clicking and holding your right mouse button)

Naked-Eye Zoom

Naked-Eye
Optical System Two: Rangefinder

The second and most important piece of equipment that both the sniper and spotter should have is a Rangefinder. For a sniper team to accurately engage enemy targets the Rangefinder must be part of their load out. This piece of equipment is very easy to use, to use the Rangefinder in the field you must press ("B") on your keyboard, the default key.

Once you pull up the Rangefinder you notice a few things. First is that your field of view as been significantly reduced while your magnification has been greatly increased. This allows the spotter to distinguish friendly units or HVT (High Value Targets) with great detail. The most important aspect of this optic is the range-finding ability just below the center crosshairs. This gives an accurate range to the spotter where they are aiming which he can then relay that distance to the sniper.

NOTE: while using the Rangefinder you must not let yourself be subject to tunnel vision. Because there is no way to zoom in and out of it you must avoid missing what is happening in the environment around you. Furthermore, with the Rangefinder in your hands you are locked to a slow walk. Important things to remember that can mean the difference between life and death.
The last Optical System is the sniper scope featured on all of the sniper rifles. The rifles that have the best magnification are the M24 and M107. With the M107 having the highest magnification of any optic system in the game. All the other rifle systems have different degrees of magnification which is something that should be considered when choosing your rifle. You can change the magnification on some rifles by using the default keys “-, +” on your number pad.
The S.N.I.P.E.R. Sequence is an easy to remember plan that a sniper team should step through to ensure they are adequately prepared for any mission.

1. **Setup** - This begins as soon as you hit the ground and includes selecting a shooting position or Hide and surveying the AO.

2. **Needs** - Once you are setup at the AO, establishing your needs is a must. Determine the Clock, Split the Sector, and develop a memory of various Ranges to landmarks as necessary.

3. **Intel** - Now that you have your needs satisfied you are ready to operate beginning with 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 enemy forces as a whole. The step may or may not be a lengthy process. It all depends on your mission. Regardless, receiving and relaying Intel sets you up for the next step.

4. **Prioritize** - While intelligence gathering never really ceases out in the field, with the most basic forms of it covered, targets appropriate to your role can now be identified and prioritized.

5. **Engage** - Target priority is your number one concern and will work hand in hand with the engagement process. Engaging a target should only be done when cleared by command and when the consequence of revealing your position has been thought through.

6. **Review** - The review process is twofold. It stands for the constant adaptation and application of this process as needed in an AO. Furthermore, it involves reviewing and improving the performance of your sniper team afterwards (what went bad, what went good, etc).

### SPLITTING A SECTOR

Once a sniper element reaches their hide location, the members should do a hasty scan using the naked-eye zoom optic system. When the hasty scan is done, and no immediate threats exist, the team has the option of splitting the AO into sectors. This can be done in various ways using roads, walls, tree lines, anything that logically splits the AO into manageable sectors for walking the sniper in on targets. Below is a town that is split using the roads. Easy to remember landmarks and lines will help the sniper get on target faster.
As you can see the AO has been split into different sectors based on the road. In this case it has been split into three sectors which are Left (Blue), Center (Red), Right (Yellow). The purpose of this is to allow the spotter to call locations like “Target left sector...”, and the sniper should know that it would be left of the leftmost road in the blue zone. The spotter would then give more precise calls and descriptive wording to walk the sniper on target which will be covered later in this chapter.

**RANGING LANDMARKS**

After the AO has been split, it is the spotter’s responsibility to get ranges to target indicators and determine the minimum and maximum engagements for the sniper and himself.

Target indicators are important because they are static objects that you’ve given certain ranges to for quick references without having to pull out a rangefinder. In the heat of battlefield, when the spotter is unable to give a range to a target, the sniper can use the previously established target indicators as base line for his shot. A neat tip you can use is to place a “nav point” (“done by holding Left Shift and clicking with the primary mouse button”) on the map in the center of your AO. This will provide you a constant reference distance to adjust from. Below is an image of what some target indicators could look like at this given AO.

![Image of target indicators](image.jpg)

The second part of this is the min and max engagement ranges for the sniper and spotter. Using this image as a reference, the spotter, depending on his weapon load-out, should engage any targets at the first circle closest to the sniper. At the maximum the spotter can engage targets out to the middle circle if need be. In the sniper’s case, he should engage anything past the middle circle in the AO. As we all know the enemy doesn’t stick to one particular area, they move around. So if the enemy is close to the team in the hills the sniper and spotter should engage to eliminate the threat. Utilizing these techniques is the most efficient way to cover an AO and engage targets; minimizing confusion.
CLOCK METHOD

This method should be the most widely used method for the spotter to call targets for the sniper. When a sniper element reaches their hide location the spotter should designate what will be called the “Clock”. This can be anything that can be easily seen by both the sniper and spotter and is usually a centralized building taller or different than most in the area. For this example, the clock is the center building and the red dot is an enemy soldier. The spotter will then be able to call “Target ...11 o’clock”. The spotter can change the location of the clock if needed. This method is highly flexible; able to be used in a variety of circumstances. If the sniper eliminates this target the spotter could even call 9 o’clock from last kill, which changes the clock to the downed enemy and his 9 o’clock.

WALK ON METHOD

These examples should be the standard form the spotter should use to communicate a target’s location to the sniper. We will use the same image above for this example, below is some basic dialogue of the communication when a sniper begins the engagement process.

Sniper: “Sniper Ready”
Spotter: “Target AT Infantry, 11 o’ clock, 50m.”
Sniper: “On Target”
Spotter: “Range to Target 952m, Fire when ready.”
Sniper: “Target Down, Sniper Ready.”

It might not be that easy; sometimes the spotter might use other buildings, terrain, etc to walk the sniper on target. The sniper and spotter will eventually become so familiar with their partner they will have their way of communicating with each other. This partnership and familiarity of thinking will be what makes your element most successful.
The general guideline we will adapt for this purpose is KISS (Keep it Simple Spotter); the more information you start throwing out there complicates things. The sniper has many other personal calculations and decisions to make and too much information inhibits his focus. Walking a sniper on a target is one of the most difficult things to master and it takes many hours of training with your spotter to get fluid enough that the communication between the two is not bogged down. Even after this point you and your spotter will continue to be challenged by situations that are new for both of you. Start working on the fundamentals and grow from there.

**TARGET PRIORITIES**

There are many marksmen who think 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. It’s about knowing when to shoot and when not to, as well as selecting the correct targets that are worth your shot. You can only begin to call yourself a sniper when you’ve mastered certain skill sets that make you more than just a shooter.

One of the more important aspects of being a sniper is identifying your targets and prioritizing them as either HVT (High Value Targets) or HTL (High Threat Level). This threat can be to you, or friendly aircraft, vehicles, and infantry squads. It comes down to your mission. If you’re tasked with providing over watch to an infantry squad on the move, you should be prioritizing targets that have the HTL to that squad.

Target priorities should be similar to as follows:

1. **Static weapons** – There are many static weapons that could affect the squad movements. The AGS grenade launcher is devastating to ground troops, but most are equally lethal. Any static weapons in the vicinity of the advancing squad should be first priority. See Appendix 2A

2. **Infantry** – Again there are many different types of infantry, AT, AA, Machine gunners, snipers, spotters. See Appendix 2A.

3. **Vehicles** – Most vehicles you can’t do too much about; however, if your carrying a laser marker you can direct air assets on target. If no laser marker is available it’s important to relay that intelligence to friendly forces on the ground. See Appendix 2A.

These priorities strictly depend on what the squad will come into contact with and what is the HTL to that squad and their mission. By prioritizing and selectively eliminating the HVT or HTL you transform yourself into a much more powerful force on the battlefield. You’re no longer indiscreetly shooting at targets as a marksman would. You become something that is much more lethal to the effort of your enemy...a sniper.
**Bullet Damage**

At the time this manual was written, we were unable to gather enough information to give a specific chart for bullet damage. However, it does exist in the game and the sniper team should be aware that as they reach the zero range and begin engaging targets past that smaller caliber do less damage. Within the zero range of a sniper system the damage is catastrophic, often eliminating the enemy with a single shot. If more information becomes available the SOM will be updated to reflect that.

**Bullet Drop**

Bullet drop is an active element in ArmA 2: OA. Most sniper systems have the ability to zero out to a distance to adjust for this allowing you to use point of aim (center of crosshairs) to engage targets out to their max zero range. If you engage an enemy beyond what your sniper system can zero you must use the hold over method to achieve hits.

In the sniper systems chapter under each weapon are ballistic charts. These charts show the max zero range and the max hold over range. The max hold over range was calculated by using the entire scope view to gain the elevation needed. This is so that the target remains in view in the scope. To engage a target after you lose sight of them in the scope for all intents and purposes should not be used. The charts give you the mil or tick adjustment for engagement of targets past your weapon’s zero. You should make note that along with bullet drop if your elevation changes, it will change your ballistic zero.

**Angle to Target**

The two main factors that affect whether or not you achieve a hit are bullet drop and angle to target. You must be able to adjust for the bullet’s drop over distance and calculate your angle to target as well. When you are in a higher elevation than your target your bullet will strike higher than you intended. This is due ArmA 2: OA having bullet ballistics. In such cases where you’re higher than your target you should either aim lower than you normal would or use the horizontal distance on the map to get your range to target. This means you need range time, the more you play and take these things into consideration, and it will become second nature. See appendix 3A.

**Bullet Travel Time / Lag**

Trying to hit moving targets is extremely difficult for a couple reasons. First is the bullet travel time each weapon has a bullet velocity and lag also plays a part. The bullet travel time is consistent...your lag, however, is not. Thus hitting a moving target an extreme range will have at least a variable of lag which you cannot predict. Again, the more you play you’ll see how long it takes for certain shots with your connection and eventually be able to better hit moving targets. A solid rule of thumb is if you believe you cannot achieve a one shot kill then you should not take the shot. It is often never worth exposing your position with a missed shot.
Selecting a suitable Sniper Hide Location (SHL) is probably the most important aspect of being an effective sniper. The spot you select is affected by several things: the first is “Does it allow me to cover my sector?” It doesn’t matter how great a spot you’ve selected, if you cannot see your AO or enough of the area you are tasked to cover, then the spot is useless.

There may come a time in a mission where the Tactical Warfare Specialist needs you to cover a certain sector, which limits the level of control you have on your Firing Position. In these cases it is best to listen to the command requests, and find the best position possible within the limits of what command has asked. If at which time you feel you can’t cover your given sector effectively, you can request to move as long as your team is aware you are not covering your sector. This request to Tactical Warfare Specialist either gives you a green light or denies your request; you then have to make the best of the situation, trust in the team’s decision, and make sure you’re prepared; never let your guard down.

**Sniper's Hide Selection**

When selecting your hide you must consider a few things beyond whether or not you can cover your sector. You want to be in a position where your target will most appear inside the AO. You don’t want to be in such a place where enemy patrols can just pop up right next to you, compromising your firing position. This almost always means your selection will be in an elevated position but there are trade-offs with this. Maintaining a ballistic advantage over the enemy is also important; however, you don’t want to be at such a high angle as it will mess with your range estimation and trajectory compensations.

Moreover, a high hill can mean your closer view is blocked, masking enemy infantry who could be advancing on your hill.

You’re looking for a hide that is inconspicuous to the enemy, a place where they’d never think a sniper would be at. Running across ridge tops to locations on the top of a mountain are bad practices. In route to a sniper location you shouldn’t ever run across the tops of hills period. The reason for this is because you silhouette your figure across the sky. This contrast against the sky makes it incredibly easy to spot you, even from a great distance.

You should be moving through valleys, forested areas, or moving behind hills so the enemy has no line of sight on you. You also want to try and avoid setting up your Firing Position on the front of mountains and hill. Mostly due to the fact your will have trouble with your egress if you’ve been compromised. Another reason to avoid this is that while lying prone you expose your body lengthwise up the hill.
On the map there are four Firing Positions (FP) placed on the map. They are all good spots, however, each has their distinct advantages and disadvantages. Each FP is less than 1000m to center of AO.

FP-1: Is overall a very well rounded position but it lacks little overall perspective of the AO. Some sections may be hidden by the veins or foothills of the mountains. This spot has a decent elevation but not too much, so Angle to Target becomes a non-issue. The position also allows for good egress into the surrounding hills.

FP-2: Is on a much higher elevation which will affect your zero range. It offers a good view of the AO; however, it leaves the sniper a little exposed on the face of the mountain.

FP-3: Is similar to that of FP-1 in regards to good egress and angle to target. Though it has an even more narrow view of the AO due to the fact of looking threw a smaller valley.

FP-4: Sits on a higher elevation so you will most likely have to adjust for your Angle to Target. The egress is good as well with a good perspective over the AO.
These are by no means the best or worst FP’s to be in. Trying to achieve the perfect FP is very difficult and time costly. We sometimes must make difficult choices and weigh the pros and cons. The three main things to keep in mind when selecting your FP is:

1. **AO perspective**
2. **Angle to Target**
3. **Egress**

All three things are important factors in the selection of an FP. It all boils down to experience trying out different FP while playing and learning what works and what doesn’t. Your FP selection will determine your overall effectiveness as a sniper team on the battlefield; poor choices = combat ineffective.

### Cover and Concealment

It’s best to have a hide that has a good combination of cover and concealment. 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’ll most likely use as cover are low walls, rocks, trees, and buildings. While good cover is important, concealment is equally as important. Concealment provides you an added aid by breaking up your outline or covering most of your body. It makes it much harder for someone that is scanning for you to pick you out of a bushes, trees, etc. Ghillie suits work well here but their color and pattern should be thought out before employing them into various environments.

### Infiltration

Once you’ve located a position on your map or already have a known position, how you infiltrate to your firing position is very important. I say infiltration for a couple of reasons. First you’re in enemy territory, just because your 1000m off an AO doesn’t mean you won’t see the enemy along the way. Second your firing position should be a secret to the enemy; you infiltrate your firing position for the fact you don’t want to be seen entering it. If you’re seen entering your hide then you, and your entire mission, and your team who relies on your cover become compromised. It is costly in many ways to have to relocate. The rule here is: haste makes waste.

You have three modes of travel that you can use as a sniper to get into your location.

1. **HALO Jump:** This is probably the most effective way to get into an area quickly while staying undetected. Quiet, low profile, and able to adapt the plan while in the air. This method of transport does leave you vulnerable.
2. **Helicopter:** This is also effective, though, you are more exposed to the threat of AA while en-route. This approach can also be very noisy, alerting the enemy to your presence.
3. **Ground Vehicle:** This is an okay choice. If you’re given the time to reach the AO a vehicle is usually a last resort. Most wheeled vehicles move too slowly over the terrain you operate in. Noisy as well, but possibly added cover and firepower.
In the case of both HALO and Helicopter insertion the LZ should be at least 500m to 1000m away from your final Firing Position. Again you want to infiltrate your firing position, not land the helicopter get out and lay down. The odds of you being seen go up greatly with the attention helicopters receive. If you’re dropped at a distance you can use terrain to confuse the enemy of your eventual location if you happen to be spotted on your way in.

You should also make use of the different movements: i.e. the standing sprint, crouch run, crawl when moving across your terrain. There is no point into getting to your Firing Position fast if you become engaged and/or killed en-route.

**Egress Tactics**

Once you’re in a suitable FP you’ll want to make sure you have an established primary and secondary egress route. It is extremely important to have these planned out before hand so in the case that you do come under fire you’re not scrambling trying to figure out where to go. You want the egress route to quickly break the enemy’s line of sight on you.

When you do get engaged and are forced to leave your firing position you must relay this to command so the team is aware that you are no longer on scope and thus combat ineffective for a short while. As soon as you break contact you should start the process of selecting a new hide; preferably one that is a good distance away from your previous spot. This is to try and minimize any residual threats from spotters, patrols, or recon jeeps that are still looking for you.

![FP-1 Egress Route](image)
This image illustrates the egress from FP-1. Even though you are just on the face of this small ridge, you will be able to hide behind the crest within 5m. Thus we see it becomes enough to break line of sight from the enemy without giving up too much height advantage.

The sniper team should move to a hold location where they will reassess the situation. If the situation is good and there is no pursuing enemy forces the sniper team can then plan to relocate to a new possible FP location. If you’re still being pursued then that building will provide a good defensive position to engage from. This demonstrates that not only do you need a fast and covered egress route but your end location should be one that is prepared enough to defend off enemies. When you’re sure it is safe to move, then re-establishing a new FP and continuing with the mission is your sniper element’s top priority.
CLOSING & FUTURE REVISION

CHAPTER 9

This ends the current work on our Sniper Operations Manual. We would appreciate all comments and response to our work and can be reached at:

Latrang – latrang@theartofwarfare.net
FelixLegion – felixlegion@theartofwarfare.net

Any and all feedback information received will be applied to later revisions to include game updates, new content and more advanced topics.

We’ve had great fun putting this manual together for The Art of Warfare and also pleased to share this with the ArmA 2: OA community. All we can say is WOW !!! What an incredible experience and pleasure it has been. Thank you!

“Sic Vis Pacem, Para bellum”
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<td>Mk17 (SD)</td>
<td>7.62mm</td>
<td>Semi/Full</td>
<td>20</td>
<td>50-300m</td>
<td>300m</td>
<td>600m</td>
<td>n/a</td>
<td>Mil-Dot</td>
<td>3, 5, 6</td>
</tr>
<tr>
<td>Mk17 (SD/TWS)</td>
<td>7.62mm</td>
<td>Semi/Full</td>
<td>20</td>
<td>50-300m</td>
<td>300m</td>
<td>n/a</td>
<td>n/a</td>
<td>TWS</td>
<td>3, 5, 6</td>
</tr>
<tr>
<td>Mk17 EGLM RCO</td>
<td>7.62mm</td>
<td>Semi/Full</td>
<td>20</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>920 mps</td>
<td>ACOG</td>
<td>3, 7, 5, 4</td>
</tr>
</tbody>
</table>

1. Variable Zoom
2. Anti-Material
3. Minimal Recoil
4. No Zeroing Capability
5. Shares Magazines
6. Suppressed
7. Range finding reticle
## Target Identification

### Appendix 2A

<table>
<thead>
<tr>
<th>Infantry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sniper KSVK</td>
</tr>
<tr>
<td>Spotter</td>
</tr>
<tr>
<td>Rifleman RPG-18</td>
</tr>
<tr>
<td>Rifleman RPG-7</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot</td>
</tr>
<tr>
<td>Officer</td>
</tr>
<tr>
<td>Commander</td>
</tr>
<tr>
<td>Crewman</td>
</tr>
<tr>
<td>Grenadier</td>
</tr>
<tr>
<td>-----------</td>
</tr>
</tbody>
</table>

| Assist AT Rifleman Front | Assist AT Rifleman Back | Rifleman | Special Purpose (Face Covered) |
## Static Emplacements

<table>
<thead>
<tr>
<th>ZU-23</th>
<th>D-30</th>
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<tbody>
<tr>
<td><img src="image1" alt="ZU-23" /></td>
<td><img src="image2" alt="D-30" /></td>
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<table>
<thead>
<tr>
<th>KORD Mini Tripod</th>
<th>KORD</th>
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<tbody>
<tr>
<td><img src="image3" alt="KORD Mini Tripod" /></td>
<td><img src="image4" alt="KORD" /></td>
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</table>

<table>
<thead>
<tr>
<th>Podnos 2B14</th>
<th>AGS-30</th>
<th>AA IGLA Pod</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Podnos 2B14" /></td>
<td><img src="image6" alt="AGS-30" /></td>
<td><img src="image7" alt="AA IGLA Pod" /></td>
</tr>
<tr>
<td>Vehicles</td>
<td></td>
<td></td>
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<tr>
<td>----------------------------------------------</td>
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<tr>
<td><img src="image" alt="Ural ZU-23" /></td>
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<td></td>
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<tr>
<td>Ural ZU-23</td>
<td></td>
<td></td>
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<tr>
<td><img src="image" alt="UAZ DShKM" /></td>
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<tr>
<td>UAZ DShKM</td>
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<tr>
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<tr>
<td>UAZ AGS-30</td>
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</tbody>
</table>
Military Off-Road SPG9

Military Off-road M2
The Angle To Target calculation is a simple one and easy to apply in the field after several experiences with it. Due to the nature of a bullet’s trajectory, as you increase the difference in elevation between you and your target, the actual distance that your bullet must travel must meet your zero range to accurately hit the location you are aiming.

There are three variables you must determine going into the calculation of Angle To Target:

- Line of sight distance (or the range through your rangefinder)
- Your Elevation
- Target Elevation

A triangle is formed between you, your target, and this difference in elevation. Using the GPS your elevation 2596m.
In the following example, a HVT is ranged at 1285m. That’s our line of sight distance, or “c”.

Next we find our current elevation by opening up the map and reading the alternate screen on the GPS, and this shows 2596m.

After that we take that number and subtract it by the estimated elevation of the target. Here we view on the map that the road sits at an elevation of 2203m. The HVT is located on the 3rd story of a building so we’ll add about 7m to that for a target elevation of 2210m and 386m is the elevation difference and our value for “a”.

Now by the Pythagorean theorem, where $a^2 + b^2 = c^2$, we manipulate algebraically solving for $b$ to find that $b = \sqrt{c^2 - a^2}$

Our calculation is as follows:

$c = 1285$
$a = 386$

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

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

$b = 1225.6m$

You can see the actual distance you need to zero for is 1225 as opposed to the 1285 as seen through the rangefinder. That’s a 60m difference that could have equated to a missed shot or even resulted in winging your target instead of a one shot one kill. This is the trick to angle shooting and understanding gravity’s affect on the trajectory of your round.