Charlie Foxtrot Standard Operating Procedures

Marksmanship

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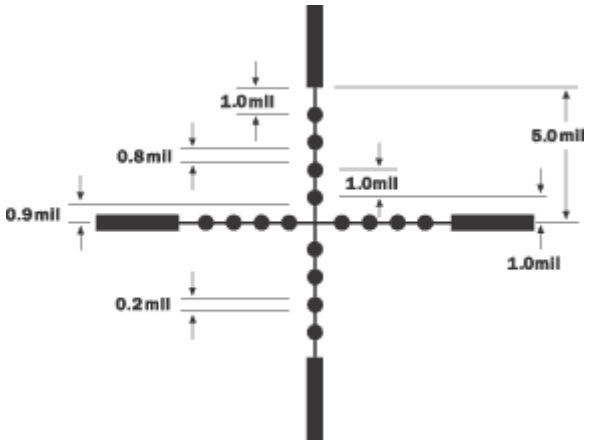
1. Mildots



Each mildot is 0.2 mils high and the distance between the dots is 1.0 mil. These are the most common measurements used and scopes adjust in 0.1 mils.

If you ever come across MOA that is a measure where 3.4377 MOA = 1.0 mil.

1 mil at 100 yards is 1 inch. 2 inches at 200 yards etc.

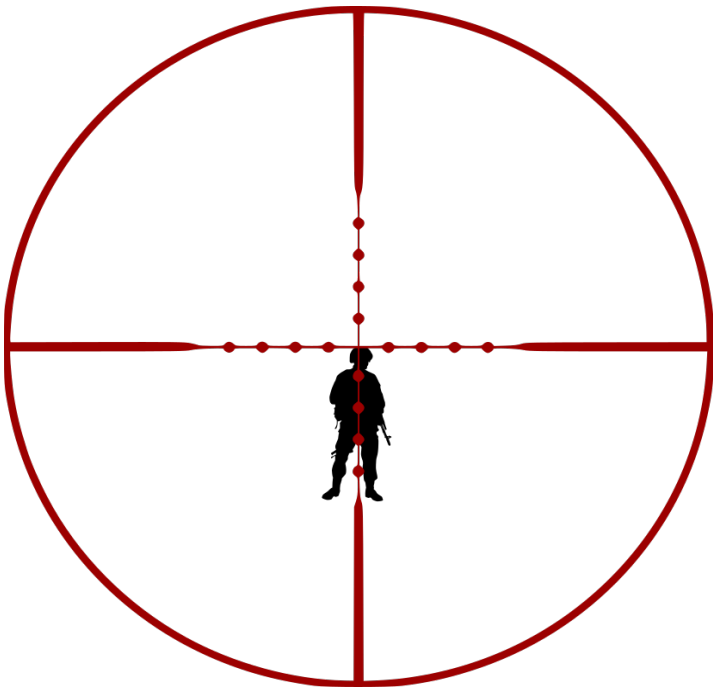
In Arma 3 all enemies when standing up and unobscured are 1.8m tall. As such its possible to calculate their range if you know how many mils high they are in your scope using the following formula:

Target range in metres = Height in metres * 1000 / mils

Which is simplified for a man as

Range in metres = 1800 / mils

For example if a man is 4.0 mils high this means the target is 1800/4 = 450 metres away.



2. Range Card

In ACE3 its possible to get a range card by using self interaction (Ctrl + Left Windows) and going into your equipment > range card. This will bring up a display showing the amount of drop in mils at a given temperature and range. There is also a windage chart with values at 4m/s wind to the right of it and the values for wind adjustment change with range.

0.308'' - 175 gr (rhs_ammo_762x51_M118_Special_Ball)
Drop Tables for B.P.: 1013.25mb; Corrected for MVV at Air/Ammo Temperatures -15-35 ºC
Barrel: 22'' 1:12'' twist

100m ZERO
B.P.: 1013.25mb

Target Range (m)	Bullet Drop (MRADs)									4mps Wind(MRADs) Air/Ammo Temp			1mps LEAD(MRADs) Air/Ammo Temp		
	-15ºC 758	-5ºC 762	5ºC 768	10ºC 772	15ºC 777	20ºC 783	25ºC 791	30ºC 800	35ºC 811	-15ºC	10ºC	35ºC	-15ºC	10ºC	35ºC
100	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.1	0.2	0.2	0.2	1.4	1.4	1.3
150	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	0.4	0.3	0.3	1.4	1.4	1.3
200	-0.9	-0.9	-0.8	-0.8	-0.8	-0.8	-0.7	-0.7	-0.6	0.5	0.5	0.4	1.5	1.4	1.4
250	-1.4	-1.4	-1.4	-1.3	-1.3	-1.2	-1.2	-1.1	-1.1	0.7	0.6	0.5	1.5	1.5	1.4
300	-2.0	-2.0	-1.9	-1.9	-1.8	-1.8	-1.7	-1.6	-1.5	0.8	0.7	0.6	1.5	1.5	1.4
350	-2.7	-2.6	-2.5	-2.4	-2.4	-2.3	-2.2	-2.1	-2.0	1.0	0.8	0.7	1.6	1.5	1.4
400	-3.4	-3.3	-3.1	-3.1	-3.0	-2.9	-2.8	-2.7	-2.6	1.1	1.0	0.8	1.6	1.6	1.5
450	-4.1	-4.0	-3.8	-3.7	-3.7	-3.6	-3.4	-3.3	-3.2	1.3	1.1	0.9	1.7	1.6	1.5
500	-4.9	-4.7	-4.6	-4.5	-4.4	-4.2	-4.1	-3.9	-3.8	1.5	1.3	1.1	1.7	1.6	1.5
550	-5.8	-5.6	-5.4	-5.2	-5.1	-5.0	-4.8	-4.6	-4.4	1.7	1.5	1.2	1.8	1.7	1.6
600	-6.7	-6.5	-6.2	-6.1	-5.9	-5.7	-5.5	-5.3	-5.1	1.9	1.6	1.3	1.8	1.7	1.6
650	-7.7	-7.4	-7.1	-7.0	-6.8	-6.6	-6.4	-6.1	-5.8	2.1	1.8	1.5	1.9	1.8	1.6
700	-8.8	-8.5	-8.1	-7.9	-7.7	-7.5	-7.2	-6.9	-6.6	2.3	2.0	1.6	1.9	1.8	1.7
750	-10.0	-9.6	-9.2	-8.9	-8.7	-8.4	-8.1	-7.8	-7.5	2.6	2.2	1.8	2.0	1.9	1.7
800	-11.3	-10.8	-10.3	-10.0	-9.7	-9.4	-9.1	-8.7	-8.4	2.8	2.4	2.0	2.1	1.9	1.7
850	-12.7	-12.2	-11.6	-11.2	-10.9	-10.5	-10.2	-9.7	-9.3	3.1	2.6	2.1	2.1	2.0	1.8
900	###	###	###	###	###	-11.7	-11.3	-10.8	-10.3	##	##	2.3	##	##	1.8
950	###	###	###	###	###	###	###	###	-11.4	##	##	2.5	##	##	1.9
1000	###	###	###	###	###	###	###	###	###	##	##	##	##	##	##

a) Elevation adjustment

As an example at 500m and 20C the range card might read -4.2. To make a target at that range the centre on your scope you would need to apply the opposite +4.2 mils to the elevation.

PGUP increases elevation by 0.1
PGDN decreases elevation by 0.1
Shift + PGUP increases elevation by 1.0
Shift + PGDN decreases elevation by 1.0

Adjusting for elevation is:

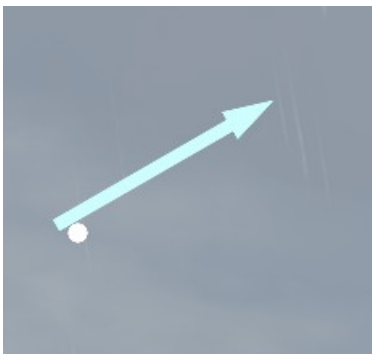
1) Correctly identified range and temperature
2) Look up values in the chart
3) Interpolate between chart values. Your range card might have values for 450m of -3.6 and 500m of -4.2 and if you know the target is between the two at 475m then can adjust to the middle point, so 3.6 + ((4.2 - 3.6) / 2) = 3.9 mils.

b) Windage

Windage is similar to elevation but it is given in the range card for 4 metres per second wind. For example a target at 850m 10C has a value of 2.0 mils. This is the amount of adjustment for 4m/s of crosswind. The scope can be adjusted with similar key binds:

Ctrl + PGDN increases Windage by 0.1 which moves point of impact left. This counters wind going left to right.
Ctrl + PGUP decreases Windage by 0.1 which moves point of impact right. This counters wind going right to left.
Ctrl + Shift + PGDN increases Windage by 1.0 to the left.
Ctrl + Shift + PGUP decreases Windage by 1.0 to the right.

You need to know the amount of wind before you can make adjustments for it. You can read the crosswind accurately with the kestrel but you can't do that quickly so its important to also be able to manually determine the wind.



Shift + K will bring up a wind display in the top left hand corner and it will show a circle if there is no wind or an arrow for direction and a number of dots representing its strength. This strength is based on the Beaufort scale shown in the table below.

Beaufort Number	Wind Speed m/s	Average Wind Speed m/s
0	< 0.3	0.15
1	0.3 - 1.5	0.9
2	1.6 – 3.3	2.5
3	3.4 - 5.5	4.5
4	5.5 - 7.9	6.2
5	8.0- 10.7	9.4
6	10.8 – 13.8	11.8
7	13.9 – 17.1	15.5
8	17.2 – 20.7	19
9	20.8 – 24.4	22.6
10	24.5 – 28.4	26.5
11	28.5 – 32.6	30.6
12	> 32.7	

You can use the average wind speed to get good results. But if the arrow doesn't point directly left or right then you need to reduce the wind amount accordingly, the arrow can be 1/3rd or 2/3rds when the wind is partially a headwind or tailwind.

For example taking a shot at 850m 10c with a 1 point wind as shown in the arrow picture shows a 2/3 crosswind from left to right.

Our range card reads 2.0mils for 4m/s.
The arrow signifies a scale of wind of 1 which is 0.9m/s.

Our crosswind is 2/3 * 0.9m/s = 0.6m/s
The range card is based on 4m/s so we have just 0.6 / 4 = 0.15 of that.
0.15 * 2.0 mils = 0.3 mil to adjust in the scope

If the wind were going right to left then we would apply -0.3 instead but the calculation is otherwise the same.

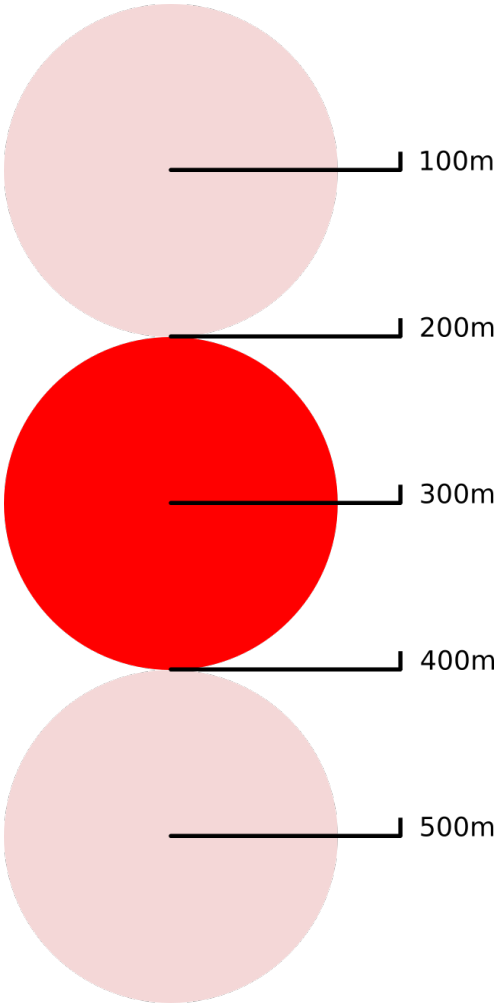
3. Hold off

Circumstances change, targets change their distance, the wind is constantly changing and the perfect setup will be wrong quickly. As such its important to learn to use a hold off.

A hold off is where instead of changing the scope we use the markings in the scope to estimate where the bullet will land. For example in the wind example above we might have the elevation corrected but no wind adjustment. We could aim slightly to the left of the target by 0.3mils to compensate for the wind, we don't have to apply it on the scope as we know the adjustments are measured in mils and we have those marked in the scope itself both vertically and horizontally.

If you miss a shot or are in a firefight prefer using a hold off, even with targets at varying ranges its much faster to make adjustment follow-up shots. 100m-500m is 4 mils on a 7.62 rifle so its possible to engage accurately and quickly adjusting for elevation and wind within that range without adjusting the scope from a 100m zero.

4. Red dots

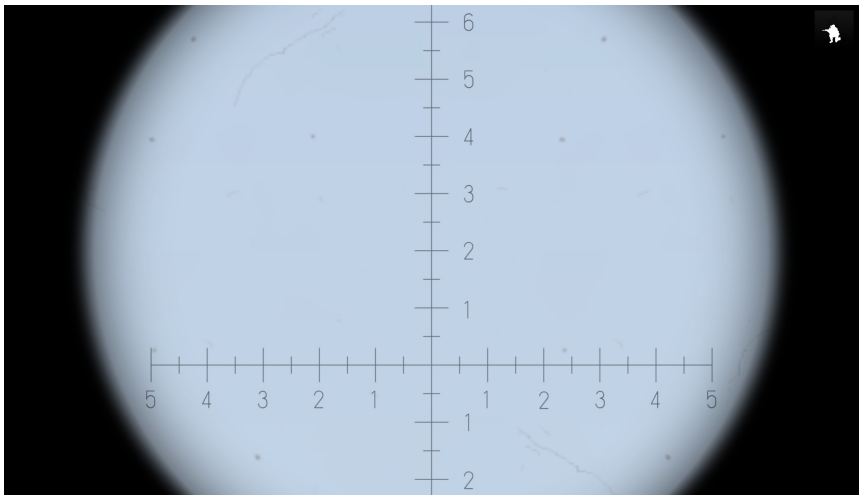


Charlie Foxtrot Rifles using red dots and 5.56 NATO rounds are zeroed at 300m. The rounds don’t have realistic trajectories and at 100m the rounds land about 0.5 a red dot above the dot, only 200-400 lands on the red dot and 500m is around 0.5 red dots below.

In real life due to the way the 5.56 trajectory works 80m also shares the same centre point as 300m. At 190m the bullet will land at the top of the dot and drop more rapidly by 500m to be a full red dot below.

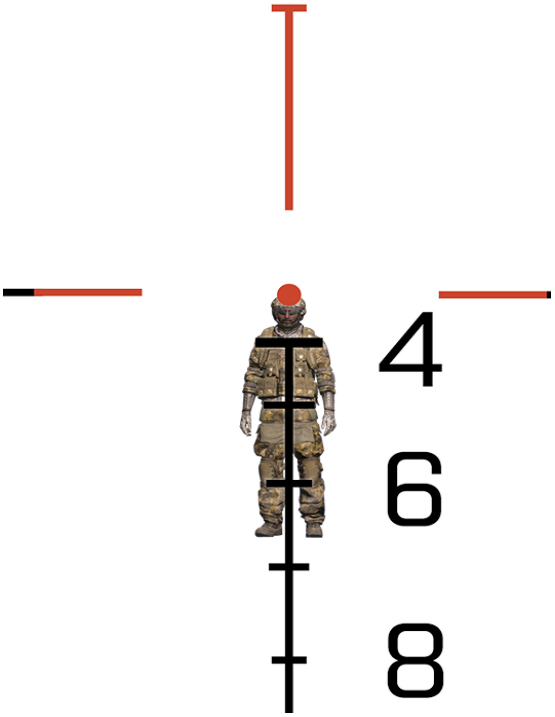
We use the M68 CCO and T1 sights and both have a 2 mil red dot. Be aware this isn't the default under RHS as normally red dots are zeroed to 100m and would show very different characteristics on servers without the CF mods.

5. Binoculars



Binoculars are also based on mils and the 1 marker represents 10 mils and the half marks are 5 mils.

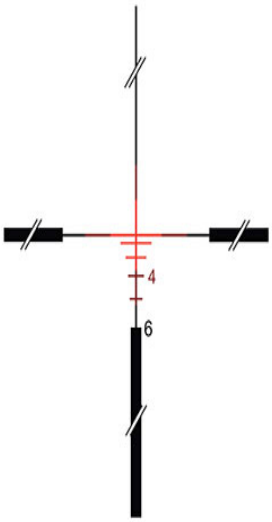
6. ACOGs



There are many variants of marking for ACOGs but they all work the same whether they have distance markings on them or not. To the left we see the RCO scope with a man at 400m.

The main idea is that the shoulder width of a man facing towards or away from you is the same width as the horizontal line. So to target with an ACOG you can line up the shoulders with the best width and fire.

To the right is the original Trijicon ACOG scope and you can see it has red shoulder bars for 100m,200m and 300m and then goes to a darker red for 400m, 500m and 600m being the maximum as the width of the bottom post.



There are also other variants which use similar schemes where the top area changes to a circle or disappears like with the RCO. All Advanced combat optical gunsights (ACOGs) are based on the shoulder width of solders at particular ranges and hence are fast ways to determine range and shoot immediately.

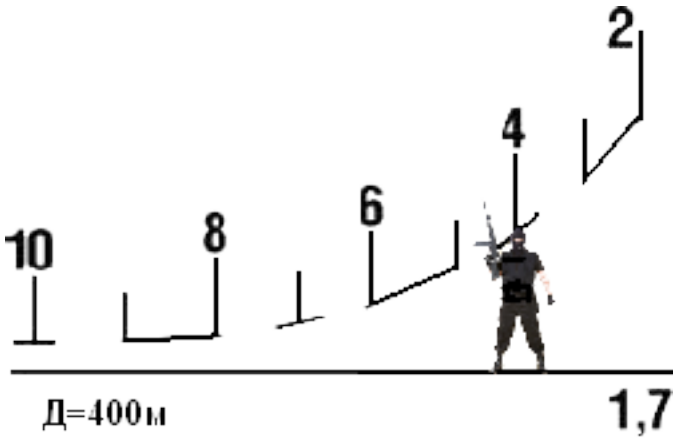
A problematic aspect of ACOGs is they are designed for compensating for the drop of a particular bullet fired at a certain velocity. That means you can't pick up one from an enemy solder and expect it to work correctly unless he has the same types of rounds and same barrel length as your gun. The default scopes adjust automagically (not realistic) but the mod ones typically don't.

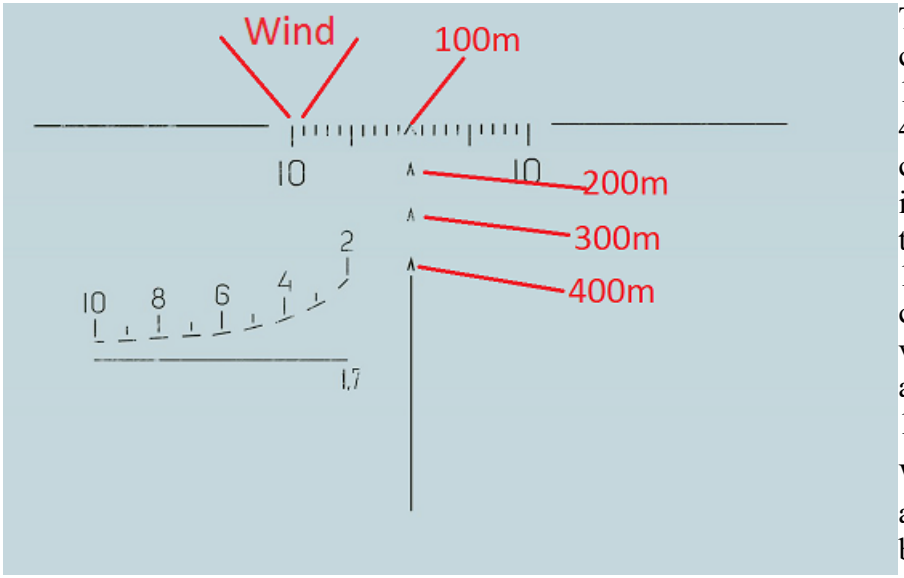
ACOGs rarely offer windage marks but if they do its typically a dot either side of the lines representing 2.2 m/s (5 mph) wind.

7. PSO

The PSO scope is used in the Independent and Russian factions. It has two aiming mechanisms, one for ranging and the other for bullet trajectory.

On the right we see the range system, where a 1.7m high enemy is placed between the bottom line and matched to the top line to find his distance. If the scope also has a secondary line between the two it is for a crouched target.





The main aiming reticle has chevrons which represent 100m, 200m, 300m and 400m but the calibre can change this and if the scope is accurately zeroed at 100m then the round should drop 1.2”, 2.5” and 4” at the lower chevrons. There are also variants with a chevron above the top line marking 100m.

Windage works by each step adjusting the point of impact by 10cm ever 100m of distance.

8. Communicating

When tracking a target make sure to keep your lead aware of how viable the kill of a target is. We use a 3 colour system for communicating this.

Colour	Viability
Green	Confident you can kill the target
Amber	Target partially obscured or far away may not kill the target
Red	Target obscured or out of range, almost no chance of killing the target

As a marksman a target in the open at 300m would be “Green on target”.
A target that has just his head showing at 300m might be “Amber on target”.
At 800m the same target however would most likely be “Red on target”.

Its a judgement call based on your rifles range, accuracy, how proficient you are with it and how well you can see the target.

9. The test

The test is to accurately range (using mildots) 5 targets and kill them between 300m to 600m. You should also be able to hit a target at 800m within 2 shots. In all wind conditions.