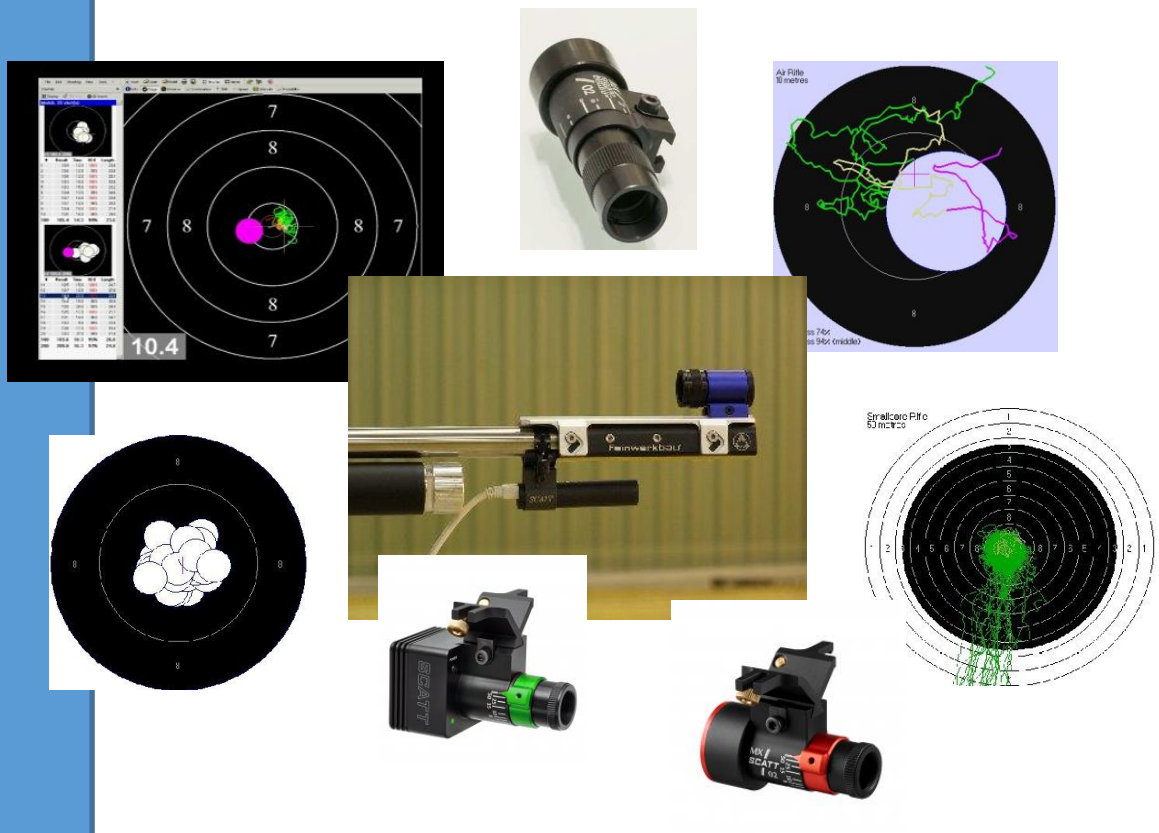
WORKING WITH SCATT



A GUIDE TO GETTING THE MOST OUT OF YOUR SCATT TRAINER

Created by Tricia Van Nus
Updated 2024

AVAILABLE SCATT UNITS

The available SCATT units are the USB version and the newer MX02 and MX02-W.

TARGETS

SCATT USB — is used for fixed target training at distances from 5 to 12 meters and imitates shooting up to 1000 meters. There is a sensor connected to the computer, and also a target that is cabled into the computer. The target of the USB SCATT is shown here which connects to the USB sensor below.

SENSORS

This is a USB sensor that attaches to the firearm, and the computer via cable. A very reliable system, which allows the sensor to be attached either below, or on the side of the firearms barrel.

SCATT MX-02 — is an electronic trainer intended for shooting practice with normal targets. The unique feature of this system is the ability to train either in the dry fire mode or in live fire, using ammunition. The trainer is also designed to be used both indoors and at open shooting ranges. There is only the sensor which connects to the computer/software

SCATT MX-02W — the latest SCATT which is also an electronic trainer intended for shooting practice with normal targets. The feature of this system is the ability to train either in the dry fire mode or in live fire, using ammunition. The trainer is also designed to be used both indoors and at open shooting ranges. This sensor connects wirelessly to the computer/software

USING A SCATT

The SCATT machine is a most exciting invention. For the first time, a coach can “see” as the shooter sees, without comment or emotion. The sensor will only show where the barrel is pointed, no more and no less, and is not affected by ammo, wind or external conditions. While the use of the machine is relatively simple, the interpretation of the data gained, requires a greater in-depth study.....as misinformation is worse than no information.

In no way does the SCATT system create perfect competition scores. It is a training aid, not a training replacement. Nothing beats old fashioned hard work on the range.

The connection procedure is not being covered in this manual – that is easily determined by following the manual that comes with the SCATT whether it is the USB or MX02 version.

With attention to the lighting on the target, especially while indoors. SCATT automatically calibrates towards the centre of the target – however if the light is low….no go!

CALIBRATION

First thing I will mention is regarding the F2 – the calibration area.

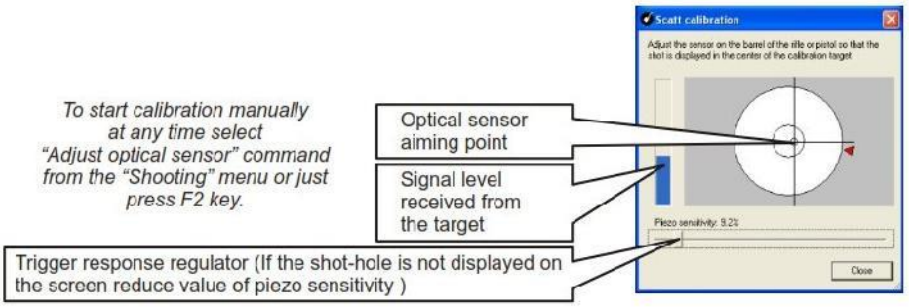
Many of the queries I get are regarding the calibration, and most are resolved quickly.

<u>MX02</u> – special detail in Calibration. Remember to "click" the correct buttons on the Calibration screen…ie if shooting outdoors – unclick the "indoor mode" button, and remember to have the filter screwed into the sensor.
Conversely, if shooting indoors, click the "indoor mode" button and take off the filter.

<u>MX02-W</u> – the included software is "SCATT Expert"
This is different to the SCATT Professional which runs the USB and MX02 SCATT machines. Follow the prompts carefully, and <u>read the Manual</u> as you complete the setup process. Ensure that you have connected wirelessly to the SCATT "network" and check that your SCATT icon is showing in the top right corner.

Take care of these details, and SCATT will obey your every wish!

CALIBRATION
This is the Calibration screen of a USB SCATT…..



Check that there is sufficient "signal level from the target"

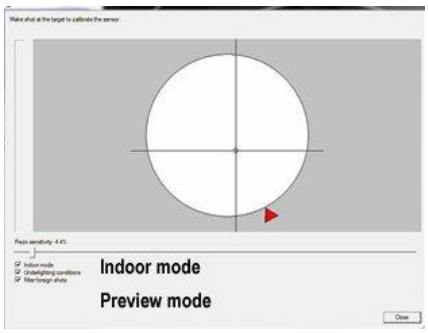
Experiment with the lighting intensity until this happens.

Remember that this is not only the light directly on the target…. you need balanced light from shooter to target (if using SCATT at home). Another hint: if you have a shiny floor, cover it with a blanket, as "shiny surfaces" often confuse the signal.

Resist the temptation to play with the piezo sensitivity – **<u>you don't need to touch it</u>**, as it usually works well on the default. If you do adjust, do it in MINISCULE increments.

This is the Calibration screen of a MX02 SCATT…..

Many features are the same – Once the software is started the screen automatically appears. If not, press F2



As stated above, the immediately useful buttons are the "indoor mode" and the "preview mode" buttons.

Indoor mode must be selected if you are shooting at home in the hallway or wherever.

When shooting outdoors, and you are having a bit of trouble getting calibrated, then click the Preview mode, and the camera will show you what the barrel is "seeing"

Once the unit is broadly calibrated, just start shooting in sighting mode.
Remember…
F3 – start match
STOP MATCH – when you have finished the session.
SIGHTERS – are not "saved" and you will waste a session if you do not hit the F3 MATCH
MX02 – turn the dial to infinity and let the unit solve what distance you are.
Use www.scatt.com or the SCATT software to print targets that suit the discipline and distance when shooting at home.

REMEMBER – the software will detect what type of SCATT you are using.
Shoot normally, normal loading, normal breathing, normal everything!

INTERPRETING SCATT INFORMATION

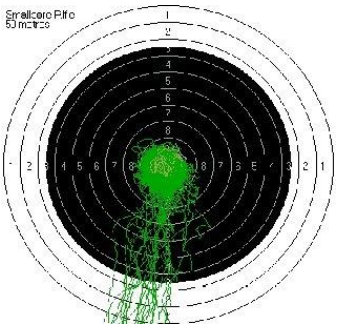
These comments apply to any version of SCATT trainer.
More and more coaches and shooters are using SCATT simulation system to assist with diagnosing faults and improving the technical skills of shooters and I firmly believe that SCATT can be used effectively for this purpose.

However, remember that SCATT is also very valuable (and often under-utilised) in its capacity to confirm and consolidate <u>good skill</u>. A shooter does not have to be in trouble technically to gain from SCATT

There is a danger that the SCATT "score" could become the sole focus for both shooters and coaches when analysing a SCATT session. Assumptions from SCATT score information, or from a small number of sessions is dangerous and, more than likely, lead to mis-information.

To obtain a clearer view of a shooter's process, a number of sessions are required. Only after analysis of a number of files, is it possible to reach possible conclusions which may be correct, but must be tested both on the SCATT system and on the Range.

In fact, if SCATT is being used as a training aid, then the SCATT score is the more often the last piece of data to be considered and is irrelevant in many cases.



During the session it is often possible to pick up differences in the shooter's technique purely from the traces on the screen. For example, inconsistencies in the direction of approach to the centre of the target, in all positions, are quite apparent.

In the Prone (and Kneeling) position, the top shooters' SCATT files show that they approach the target consistently from below (because of breathing); stop on the target once they reach it; hold steadily within the centre ring for the last few seconds; fire the shot on the first attempt most times; fire the shot within the count of three or four once they are centred; follow through for at least one second (ie. remain centred on the target).

All of this can be seen in the trace patterns on the screen and provides useful feedback for both shooter and coach.

Before beginning to analyse and SCATT files, it is necessary to check for any "shots" which have registered zero, perhaps SCATT has recorded a shot as the action was closed. Such shots should be deleted as they distort the information being read.

In the Standing position (3P and Air Rifle), the top shooters' SCATT files show that they approach the target consistently from above (because of breathing); stop on the target once they reach it; hold steadily within the centre ring for the last few seconds; fire the shot on the first attempt most times; fire the shot within the count of four or five once they are centred; follow through for at least one second (ie. remain centred on the target).

If you or your shooters are not following this pattern, (and that can be seen in the first SCATT session), then the first step is to work through the approach and breathing before delving further with SCATT. The changes can then be confirmed through SCATT.

Any shooter "breathing through" the target and forcibly pulling the firearm back to the target, should be stopped immediately and corrected. They are using far too much energy on clawing their way back to the target.

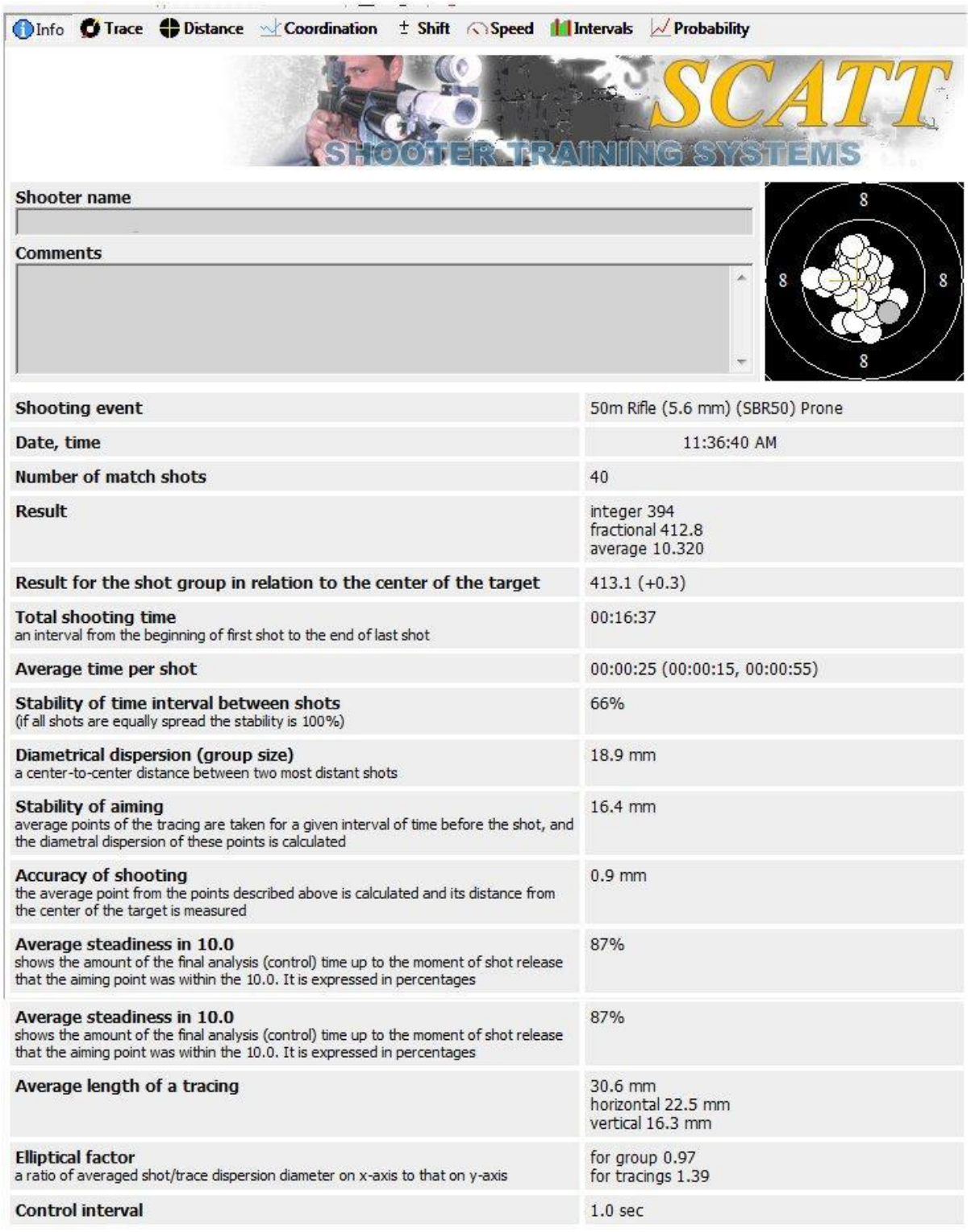
Another area that causes concern is when the shot appears “well away” from the traces. There is a simple solution.

1. Check the lighting strength. It might be too low or too bright.

2. More than likely, the SCATT has determined that the swing of the firearm was heading in that direction, and, although the shooter may swing it back (or they think they do) SCATT recognises that the shot was heading in that direction, and shows where it would have been.

GENERAL INFORMATION

Let’s look at the ***General Information*** screen (SCATT Professional)



Shooting event	50m Rifle (5.6 mm) (SBR50) Prone
Date, time	11:36:40 AM
Number of match shots	40
Result	integer 394 fractional 412.8 average 10.320
Result for the shot group in relation to the center of the target	413.1 (+0.3)
Total shooting time an interval from the beginning of first shot to the end of last shot	00:16:37
Average time per shot	00:00:25 (00:00:15, 00:00:55)
Stability of time interval between shots (if all shots are equally spread the stability is 100%)	66%
Diametrical dispersion (group size) a center-to-center distance between two most distant shots	18.9 mm
Stability of aiming average points of the tracing are taken for a given interval of time before the shot, and the diametral dispersion of these points is calculated	16.4 mm
Accuracy of shooting the average point from the points described above is calculated and its distance from the center of the target is measured	0.9 mm
Average steadiness in 10.0 shows the amount of the final analysis (control) time up to the moment of shot release that the aiming point was within the 10.0. It is expressed in percentages	87%
Average steadiness in 10.0 shows the amount of the final analysis (control) time up to the moment of shot release that the aiming point was within the 10.0. It is expressed in percentages	87%
Average length of a tracing	30.6 mm horizontal 22.5 mm vertical 16.3 mm
Elliptical factor a ratio of averaged shot/trace dispersion diameter on x-axis to that on y-axis	for group 0.97 for tracings 1.39
Control interval	1.0 sec

NOTE - SCATT DISPLAYS THE AVERAGE OF ALL SHOTS IN THE SESSION

THE FIRST IMPORTANT ONES

average length of a trace

on a particular shot, how long was the yellow and blue portion (last 1 second) of the tracing. How steady are you in the last second of the shot.

#	Result	Time	10.0	Length		#	Result	Time	10.0	Length	
1	10.4	16.6	90%	46.8	2.4	1	10.5	17.0	100%	32.9	0.5
2	10.2	16.2	95%	61.3	6.7	2	10.6	11.0	100%	32.3	2.9
3	10.9	29.9	97%	48.4	4.0	3	10.5	21.0	99%	31.0	1.0
4	10.3	15.2	100%	48.4	4.7	4	10.6	16.0	100%	34.9	1.2
5	10.7	25.0	97%	54.9	3.5	5	10.7	16.0	100%	39.5	1.4
6	10.3	15.7	99%	56.5	2.7	6	10.4	14.0	99%	32.4	2.6
7	10.7	22.8	86%	62.0	6.3	7	10.6	21.0	100%	38.1	0.5
8	10.3	19.8	100%	46.3	2.8	8	10.8	16.0	100%	27.1	0.8
9	10.7	18.9	98%	56.3	2.2	9	10.6	12.0	100%	26.3	2.2
10	10.5	26.1	83%	53.6	2.4	10	10.4	18.0	100%	29.5	0.7
100	**105.0**	**20.6**	**94%**	**53.4**	**3.8**	**100**	**105.7**	**16.2**	**99%**	**32.4**	**1.4**

Here are two examples of that "trace" – the yellow/blue bits stretched out and measured.

Both are prone, and I would certainly be wanting to see more in line with the numbers on the right hand example.

The average is 32.4 – perfect for prone shooting.

The shooter with the 53.4 average is OK, however it could well be improved ie lowered.

stability of aiming

*the **average size of the group of yellow traces** (the last second before firing) measured from centre to centre – again linked to steadiness prior to shooting*

diametral dispersion

*the **average size of the group of shots** measured from centre to centre of widest dispersed shots*

the average steadiness in the 10.0 or centre of the target

the average percentage of time the trace patterns (in the last second before firing) were within an area the size of the ten ring or target centre.

The above pieces of information are linked because all are indicators of good central holding capability and good trigger/follow through technique. **If stability of aiming (yellow trace group size) is a number less than diametral dispersion (group size), it is an indication that the shooter has good eye perception, sights, including ring size for the firearm and solid sighting or aiming technique.**

Where diametral dispersion is much larger than the stability of aiming, it could be an indication that there is an issue with eyesight, trigger control, or the whole shot release technique. The ideal is where both are small and close together in size.

Bear in mind when shooting and analysing data, that the F coefficient should be set around 50. (This is a "degree of difficulty" and is found under Tools, Shot parameters) The more expert shooters will find that a coefficient of 60-65 will serve them better, and a new shooter will work around the 35-40 mark.

HINT: It is also preferable to compare the data from files with a similar number of shots in each, but in practice this is not always possible. Always shoot at least 20 shots in each session.

When looking at improvement over time, the single most useful piece of information on the General Information screen is the **average length of the trace**, expressed in mm. This shows quite clearly whether a shooter's hold is improving in terms of how small or large the area of hold on the target is. Reducing the mm indicates that the hold pattern is reducing in size, and providing the trigger technique is sound, there is a much greater chance of getting a shot in the centre of the hold pattern.

Steadiness in the 10.0 or centre is also a useful tool for looking at the effects of changes in position, clothing, and equipment, such as butt position in standing or the sling for prone.

The effect of the heartbeat is transmitted mainly through the sling, but also the wrist or hand can be seen, not only in the traces, but also in the steadiness data for each shot as well as in the average steadiness figure in the general information. Experiments with the sling or sling position can be aimed at minimising the effect of heartbeat.

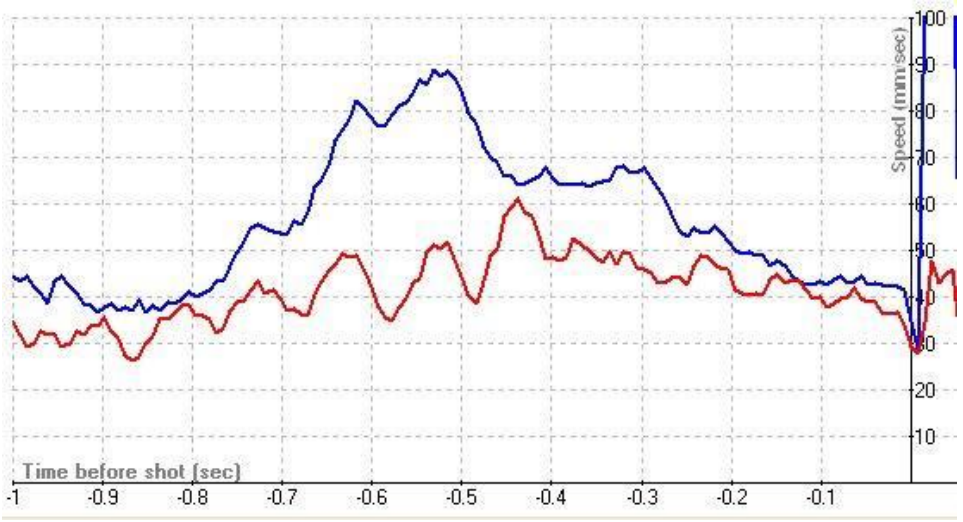
The next step is to look at the ***Speed Graph*** which shows how fast the barrel was moving **on average** over the last second (this is also shown in the trace length which is the measure of the length of the trace pattern on the target screen over the last second before firing, ie. slower movement leads to shorter trace length – which, of course is better).

Speed - On the SCATT system the movement is measured in mm per second.
A downward trending wave pattern is ideal on this graph in the prone position.
Having the minimum speed (y-axis) at shot release is preferred.

The speed points are of interest and can often be correlated with the location of similar points on other graphs such as ***Co-ordination*** and ***Shift Graphs.***

SPEED GRAPH

The vertical axis shows the speed of the barrel's movement in mm/sec



REMEMBER THAT THESE ARE AVERAGES GAINED FROM THE SHOTS PRESENTED.

To explain the horizontal axis this shows the last one second of the firing process from left to right – and the vertical axis is exactly when the shot was fired.

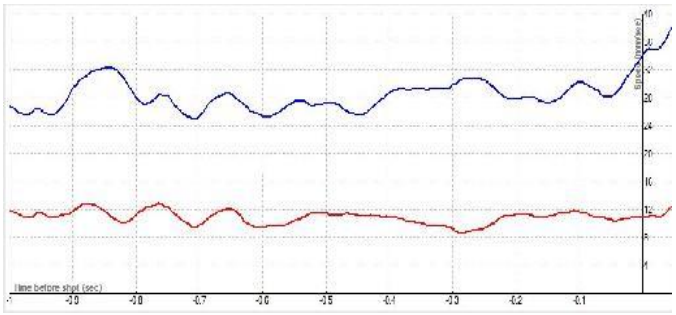
When looking at the BLUE shooter above (top graph), it emerges that one of the aims of training should be to work on reducing movement, through fitness, position refinement and technique training. While the numbers show a movement of just over 30mm of movement at the moment of firing the shot – there is a major spike within that last one second.

The other shooter's graph (lower graph in RED) shows less movement overall and has a small range (difference between highest and lowest movement).

However, in both the shooter's favour, the graph is decreasing as the shot is being fired (the axis on the right) – this is good. As a coach, I notice that that although both shooters have a similar level of movement at the moment of firing the shots, I would suggest that the RED shooter would be more reliable to attain a better score.

If training is effective, improvements will show up in the graphs and data in subsequent SCATT sessions. It is a good experimental tool as well, but it is important to remember that whatever is tried on the SCATT system must also be confirmed on the Range to verify that any changes work in the real world of live shooting at the appropriate distance.

For example, if the optimum sighting is being checked out for whatever distance, then it must also be confirmed on the Range as several factors could be different such as lighting or target height, any of which could affect what works best for the individual shooter.



As you see in this example, the BLUE shooter (top graph), although with a fairly level graph line (good) the speed/movement is far higher with a trend line of around 28mm, compared to the RED shooter (lower graph) with a level line, at a much lower rate of around 11mm.

The BLUE shooter also has the issue of a movement INCREASE as they fire the shot....not good. Check the trigger mechanism and technique immediately.

Effective training would include: checking and resolving pressure points / relaxation to reduce heart beat / checking sling tension / ensuring that the shooter is not holding in "shot mode" for too long ie "colouring in"

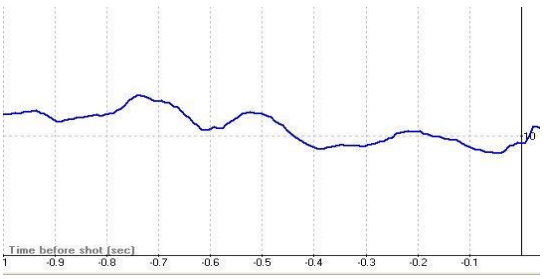
It is a good technical experimental tool as well, but it is important to remember that whatever is tried on the SCATT system must also be confirmed on the Range to verify that any changes work in when live shooting.

After looking at ***General Information & Speed Graph***, the next priority for analysis is to look at the ***Co-ordination Graph.*** This also looks at the firearm's movement in the last second of the "hold"

WHAT TO LOOK FOR*: A downward (or more level) trending wave pattern is ideal on this graph in all positions. Having the minimum speed (y-axis) point at shot release is preferable.*

CO-ORDINATION GRAPH

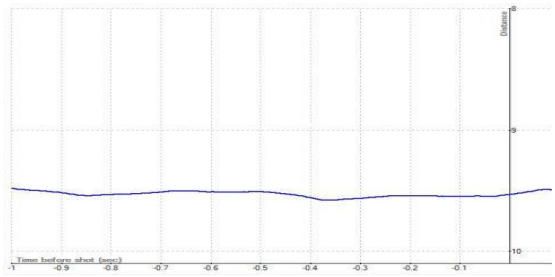
DIAGRAM 1



This is a very important graph that shows from the moment that the brain sends the signal (the vertical line on the left) to the fingertip to release the shot (the line on the right of the graph when it is shot).

Given that normal human reaction time is about 0.2 of a second, the quality of hold in that last 0.2 of a second is critical as to whether the shot will go off inside the desired area of aim or not.

DIAGRAM 2



If the graph remains in a straight line, or tends downwards, like the example left, then the hold is being maintained well. At this moment, aiming becomes less important and the essential thing is the co-ordination of a steadily maintained hold and good shot release technique (trigger).

If there is a turn upwards in the graph after the dip (similar to Diagram 1), then both coach and shooter know that between the instant the brain has signalled the finger, and the shot being released (during that last critical 0.2 of a second) the quality of hold has deteriorated resulting in a shot off centre.

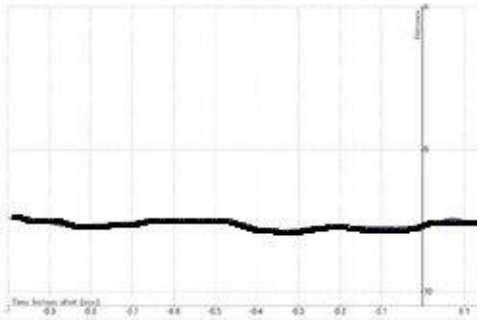
FIRST SOLUTION – check the trigger for dust, poor settings (too light or too heavy) as well as the shooter's general trigger control.

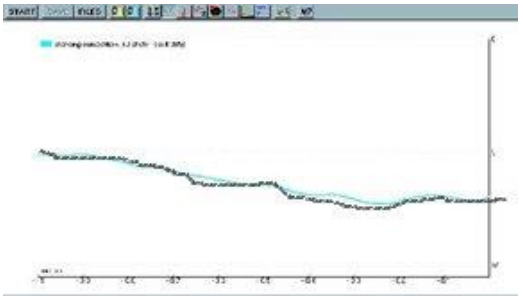
SECOND SOLUTION – work with the shooter to settle on the target and just take the shot (ignoring the pure score). Get used to "settle and shoot" Get past the checking and double checking. Use cue words "smooth" or the like, to emphasise trigger control.

A good SCATT exercise to help here is for the shooter to set up in position and watch the screen while going through the breathing, centring, firing and following through process.
It is rather un- nerving to begin with but can pay dividends in the long run by correcting this fault.

The **Co-ordination graph** represents the ability of the shooter to hold the aiming point in the centre of the target, and/or to reduce the central zone of aiming during the approach to the shot and at the moment of the shot. It is an excellent criterion by which the technique of the shooter can be judged.

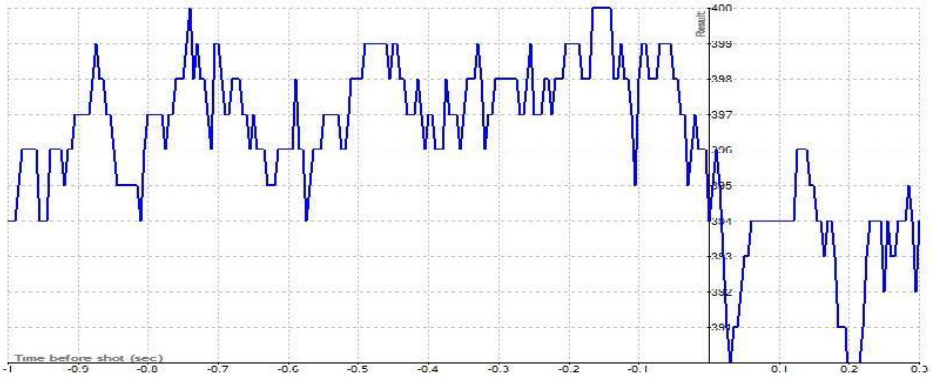
***REMEMBER WHAT TO LOOK FOR**:*
The graph remains in a straight line (below left), or tends downwards, (shown below right) then the hold is being maintained well.





Working towards a graph like these examples will only help the shooter to achieve greater performance.

SHIFT GRAPH



On the ***Shift Graph*** the lines should appear stable in the –0.3 to –0.2 area, ie the last fraction of a second before the shot is released.

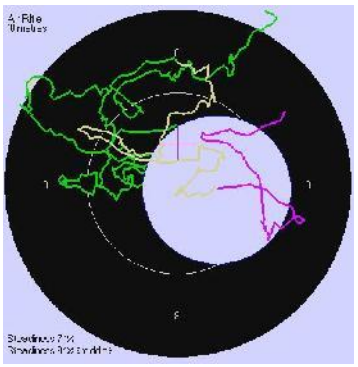
This indicates that the hold is being maintained well and that the chances are high of obtaining a good result in terms of group size and score.

The horizontal axis gives time in seconds prior to shot release, and the vertical axis is a numerical score axis This graph tells us what the score would have been had the shot been release at any other time in the last second and the vertical dotted lines show the times when the highest score would have resulted.

***WHAT TO LOOK FOR**: The more "flat tops" the better – this indicates that hold is being maintained well. In the example above, look at the area between 0.2 and 0.1*
The shooter in this example is not shooting to their maximum potential, as the greatest area of "flat-tops" occurs 0.2 of a second prior to the actual shooting.

It is impossible to ask a shooter to shoot 0.2 of a second earlier – however it is possible to work through "smooth trigger release" exercises and more positive self talk.

TRACE REVIEW



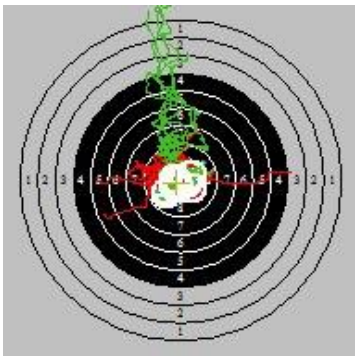
Once there is a file to view, the first reaction is to look at the shots fired. Shooters and Coaches can review the shot/s. The shots will be shown in real time and provide clear evidence of the precise barrel movement.

HINT: in the "Options" – look for "how much trace to store" and change that to 8 seconds. The default is shorter, and it does not give enough time to see the approach to the target.

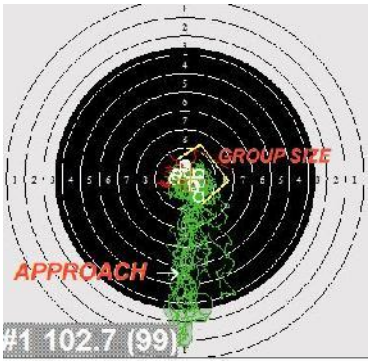
Usually coded as GREEN (last 7 seconds of recording) YELLOW (last 1 second with BLUE as the last 1/10th of a second) WHITE CIRCLE (shot indicator) FOLLOW-THROUGH (red)

Having said that – the operator can change colours to suit.

***WHAT TO LOOK FOR:** When examining files, one golden rule is that the final approach (yellow/blue), the shot (white) and the after shot recording (red) should be as close to "over" one another as possible. This is logical as is shows that the hold in that last one second is steady and the trigger release reliable. The ability to achieve this varies slightly with the shooting position (prone being the most stable).*



The approach to the target should be similar in all shots – from the top in standing shooting (*right*) and coming from the bottom in prone and kneeling (*below*). Having said that, if a shooter has a small variant from these usuals, and is highly consistent.....then there is no need to worry.



It is probably not as dogmatic to state where the shooter should approach the target, (except – from below in prone and kneeling and above in standing) but rather the approach is consistent over many, many shots.
If consistency fails – step in and correct!!

Using the "**show all tracings**" option in the SCATT Professional software, the coach can review the target approach on screen.
The diagram on the right shows the tracings of all shots in a particular session. From the stability and direction of the tracings, it is identified as prone.

WHAT TO LOOK FOR: CONSISTENCY!
This shows that during the last 8 seconds of hold the shooter is approaching, settling and taking the shot – no chance of "waiting on the target" for too long here.

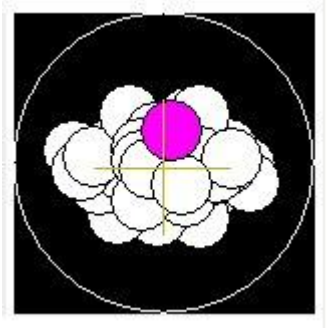
Prone shooters are notorious for checking and double checking the aim, "colouring in" the centre and waiting for a 10 to become an 11

REMEMBER - Under the TOOLS and OPTIONS the operator can change the amount of trace to store. I always use 8 seconds – this is an excellent timing, as I do not want to only see the tracings all in the middle of the target (that is colouring in, not shooting) however I want to see a good approach. The 5 second default setting is just too short (in my opinion)

OTHER GRAPHS OF NOTE

If the shots are being released at very close to the slowest possible speed (y axis) on the ***Speed Graph*** and the line on the ***Co-ordination Graph*** is almost level or trending downward, then the shots are generally being released at the optimum time, and as long as the firearm is pointed in the centre of the target of course, the shot will give the desired result.

The ***Intervals Graph*** depicts the value of the shots in a bar graph with the spaces between the bars showing the amount of time taken between each shot. In a training situation, this is not so relevant, as there may be time taken for discussion between athlete and coach. It is more used for an athlete who is in Air Rifle match practice mode, or in an Air Rifle control match where such a regular routine is requested

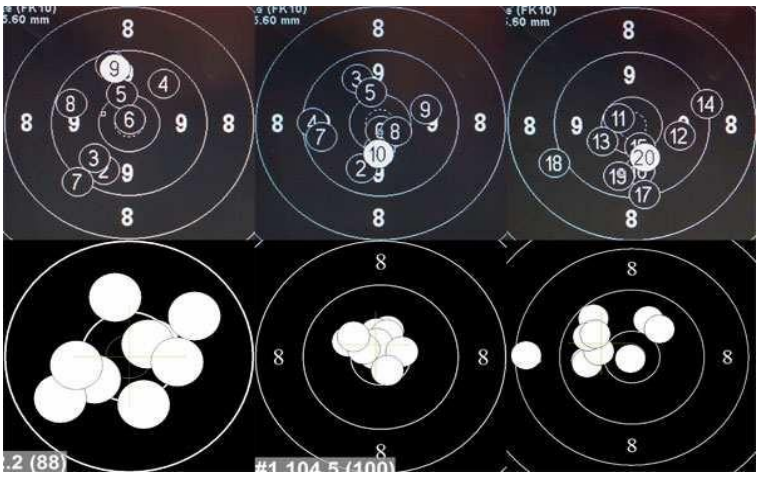


Also look at the ***Shot Groups*** as a whole. This gives a very visual idea of the range or size of the group, and is often easier to digest than a bunch of numbers. The large cross that appears is indicating the group centre.

Remember it is better to look at this information, rather than concerning oneself about pure score.

This is a standing shooter, and the movement from left to right (albeit very small) is the reason for the elongated group shape

PRACTICAL EXAMPLE – Intermediate shooter



Using a MX02 - shows the LIVE FIRE on the top, and the SCATT on the lower.

The shapes of SCATT and live-fire groups are largely comparable. It is not realistic to expect them to match exactly, due to the random dispersion inherent in ammunition and weather, which SCATT cannot readily replicate.

Ammunition is especially a factor in these groups, as he was shooting his practice ammo, which is likely why his second live fire group is so much larger than the SCATT group.

Despite the potentially uncooperative ammo, the tracings captured by SCATT explain a lot about performance. Take, for example, shots marked #14 and #18 within his third 10-shot string, which are to the extreme right and left of the group, respectively, both in SCATT and on the live target.

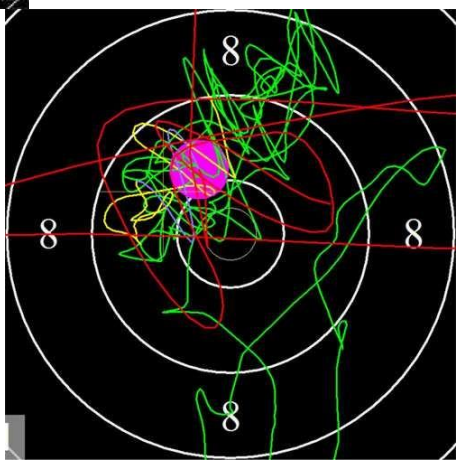
The shot tracing in shot #14 on the next page, shows that the aim was high, and then got pulled to the lower right at the moment of shot release, whereas during shot #18, the aim was continuously listing toward 8 o'clock.

This tells us that the shooter needs to improve trigger release, during which the point of aim should not move. The quality of his natural point of aim is also suspect, as a shooter's aim tends to drift to his true NPA if it is not aligned with the centre of the target. The actual SCATT tracings tell us exactly what caused those two shots to go so far afield. Disregard the fact that SCATT zero is quite a bit off from the live zero; the relative position of two shots is what we are interested in.

Notice that the “wobble zone”, as indicated by the yellow lines (left), is a little larger than the 10-Ring.

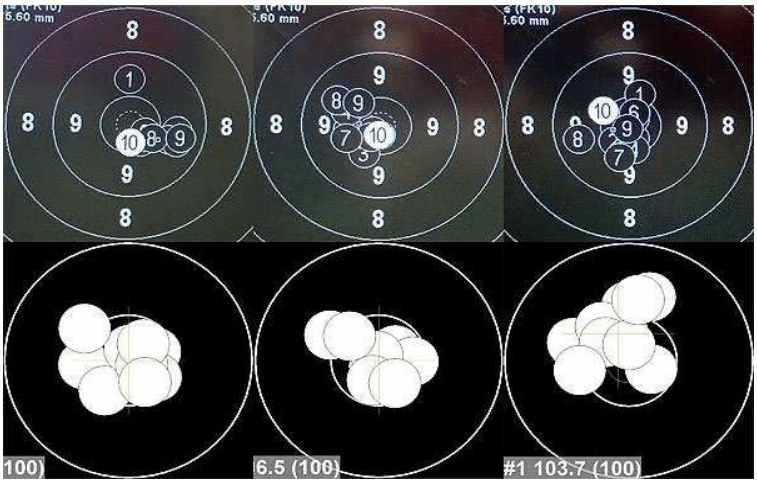
It can certainly be reduced considerably, if he works on improving position.

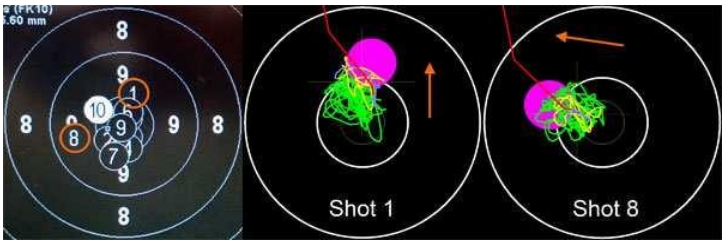
The approach to the centre, as indicated by the green line, is rather chaotic, which suggests to me that he is steering the gun rather than relying on a sound NPA. The recoil pattern, indicated by the red line, is usually vertical, but can sometimes be out of control, as shown in the tracing at right.



Thus, the use of SCATT MX-02 in live fire has provided considerable insight into the performance of an intermediate-level shooter. Granted, a lot of this information can be acquired from dry firing with SCATT, but some factors, such as recoil characteristics and the role played by ammunition quality, can only be evaluated in live fire.

PRACTICAL EXAMPLE – Top level shooter





Similar experiment with a top shooter in which the SCATT and live fire were far more “in sync”

However, when the third string is examined, there are two shots that are at the extreme edge of the group.

Is this ammo?
Is this wind?
Is this a small lack of attention?

The latter is true, upon examination of the SCATT tracing – notice how the shooter was indeed drifting the shot in that direction, even after a solid start to the shot.

VERY USEFUL TABLE/S

If using the SCATT at home, there is a need for a relatively accurate way to place your target.

As mentioned earlier, scaled Targets can be printed from the SCATT software, or website, however it is also useful to have the target at the right height, otherwise the training will mean little, if the range targets are completely different.

BELOW IS THE TABLE TO 10m AIR RIFLE TARGET PLACEMENT

Muzzle Height from the ground	AIR RIFLE TARGETS Scatt Target Distance (from shooter)										
	5.00	**5.50**	**6.00**	**6.50**	**7.00**	**7.50**	**8.00**	**8.50**	**9.00**	**9.50**	**10.00**
0.20	0.80	0.86	0.92	0.98	1.04	1.10	1.16	1.22	1.28	1.34	1.40
0.30	0.85	0.90	0.96	1.01	1.07	1.12	1.18	1.23	1.29	1.34	1.40
0.40	0.90	0.95	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40
0.50	0.95	0.99	1.04	1.08	1.13	1.17	1.22	1.26	1.31	1.35	1.40
0.60	1.00	1.04	1.08	1.12	1.16	1.20	1.24	1.28	1.32	1.36	1.40
0.70	1.05	1.08	1.12	1.15	1.19	1.22	1.26	1.29	1.33	1.36	1.40
0.80	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.31	1.34	1.37	1.40
0.90	1.15	1.17	1.20	1.22	1.25	1.27	1.30	1.32	1.35	1.37	1.40
1.00	1.20	1.22	1.24	1.26	1.28	1.30	1.32	1.34	1.36	1.38	1.40
1.10	1.25	1.26	1.28	1.29	1.31	1.32	1.34	1.35	1.37	1.38	1.40
1.20	1.30	1.31	1.32	1.33	1.34	1.35	1.36	1.37	1.38	1.39	1.40
1.30	1.35	1.35	1.36	1.36	1.37	1.37	1.38	1.38	1.39	1.39	1.40
1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
1.50	1.45	1.45	1.44	1.44	1.43	1.43	1.42	1.42	1.41	1.41	1.40

BELOW IS THE TABLE TO 50m RIFLE TARGET PLACEMENT

Muzzle Height	50m RIFLE TARGETS Scatt Target Distance (from shooter)										
	5.00	**5.50**	**6.00**	**6.50**	**7.00**	**7.50**	**8.00**	**8.50**	**9.00**	**9.50**	**10.00**
0.20	0.25	0.26	0.27	0.27	0.28	0.28	0.29	0.29	0.30	0.30	0.31
0.30	0.34	0.35	0.35	0.36	0.36	0.37	0.37	0.38	0.38	0.39	0.39
0.40	0.43	0.44	0.44	0.45	0.45	0.45	0.46	0.46	0.46	0.47	0.47
0.50	0.52	0.53	0.53	0.53	0.53	0.54	0.54	0.54	0.54	0.55	0.55
0.60	0.61	0.62	0.62	0.62	0.62	0.62	0.62	0.63	0.63	0.63	0.63
0.70	0.70	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
0.80	0.80	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
0.90	0.89	0.88	0.88	0.88	0.88	0.88	0.88	0.87	0.87	0.87	0.87
1.00	0.98	0.97	0.97	0.97	0.97	0.96	0.96	0.96	0.96	0.95	0.95
1.10	1.07	1.06	1.06	1.05	1.05	1.05	1.04	1.04	1.04	1.03	1.03
1.20	1.16	1.15	1.15	1.14	1.14	1.13	1.13	1.12	1.12	1.11	1.11
1.30	1.25	1.24	1.23	1.23	1.22	1.22	1.21	1.21	1.20	1.20	1.19
1.40	1.34	1.33	1.32	1.32	1.31	1.30	1.30	1.29	1.28	1.28	1.27
1.50	1.43	1.42	1.41	1.40	1.40	1.39	1.38	1.37	1.37	1.36	1.35

Many thanks to Owen Oliver for the production of these tables.

SUMMARY POINTS

GENERAL FOR ALL MODELS	
SOFTWARE	download the correct drivers for your computer if required. Install them first, and then install the latest SCATT software. **NOTE: Windows 10/11 does not need the "drivers"**
LIGHTING	working with any SCATT model means being aware of lighting conditions on the target and the shooter. Too much or too little will bring you undone. Shiny/reflective floors may also require a rug.
SHOOTING	Scatt starts in CALIBRATION mode – this is a broad calibration to ensure that the SCATT signal is roughly centred, or at least on the target. USE IT EVERY TIME. Sighter mode – you must press F3 or MATCH to start recording shots, and STOP when you are finished. Sighters are not "saved" and many shooters have lamented this fact.
ZOOM	The computer's number keys will zoom in and out of the target. That is, 9 = the nine ring and 1 = the whole target.
TARGET	Use scatt.com to download/print target at appropriate sizes, and the height chart in this document to determine the correct height on the wall, relevant to your discipline/position.
CO-EFFICIENT	The degree of difficulty bit. Use around 35-40 for a newer shooter, and 50-55 for an intermediate shooter, and 60-65 for a top shooter. Adjust this BEFORE YOU START SHOOTING.
USB	
CALIBRATION	In this mode (F2), the red light should show on the top of the target frame, and disappear when you close that screen
INSTALL	Connect one feature at a time to the computer ie the target (and let it install) and then the sensor (and let it install)
SERIAL / KEY	The first time you connect, the software will probably ask for the key. These "keys" are once only entered, and if you mislay the sheet showing the keys – they can be replaced.
MX02 & MX02-W	
DISTANCE	turn the dial to infinity and let the unit solve the distance.
FILTER	if outdoors, use the small filter – screw onto the unit, and if indoor – take it off
MODE	there is both an indoor and outdoor mode, depending on where you are shooting
EXPERT	Files that are created with SCATT Expert, can be viewed in SCATT Professional software.

AVOID

PIEZO – avoid playing with the piezo sensitivity – there is rarely a need to change the default.

PREVIEW MODE – This is a last resort feature, not the first option.

FINALLY....

Appropriate interpretation of the SCATT information is dependent on an understanding of the individual, and sometimes discussion with the shooter can be more revealing that the data.

Bullet dispersion is used only for analysis and would usually be set at 10-14mm for that purpose, remembering that dispersion is measured from centre to centre of the widest shot holes. Unless a value is set for bullet dispersion SCATT assumes a value of 0, ie that any ammunition used has the capability of shooting through the same hole on every shot, which is not an issue, as it is the technique that SCATT is looking at the most.

One other feature of the SCATT system that is mentioned previously, and is of interest is the F coefficient which is the result of a mathematical calculation to do with the speed of the projectile, the distance to the target, and the speed and direction of movement of the muzzle at the moment of shot release. Usually set in the region of 45-65, it can be increased for the better performers. Don't fret about the explanation....just accept it.

You will notice that I have not included SCATT BASIC – my experience has not extended to this unit, however most of the same rules apply.

When using the SCATT as a training tool to improve skills, a picture begins to emerge which indicates that coaches should be training their shooters to:

- ✓ Reduce movement (trace length and speed graph)
- ✓ Improve hold (steadiness in the 10.0 or centre)
- ✓ Improve aiming consistency (stability of aiming)
- ✓ Reduce group size (diametral dispersion)
- ✓ Improve co-ordination of hold and trigger (co-ordination graph)
- ✓ Optimise shot release technique (shift graph)
- ✓ Place less emphasis the SCATT score

This can be achieved through fitness, position refinement, technique training, and so on. If such training is effective, it will show up in the graphs and data on the SCATT system - so the SCATT system becomes important, not only in diagnosing faults but also in checking progress and confirming the effectiveness of training.

SCATT is a good experimental tool as well, but it is important to remember **that whatever is tried on the SCATT system must also be confirmed on the Range to verify that any suggested changes work in the real world of live shooting** at the appropriate distance. **Testing and working with SCATT provides a chance to correct and confirm the pure shooting PROCESS without the influence of recoil or ammunition variances.**

I have attempted to notate as much as reasonably possible to get you running effectively. The further in-depth interpretation of the information relies more on far more experience with the system, and cannot be readily or instantly documented in this small number of pages.

Time to stop reading and getting SCATTing.
Tricia Van Nus
2022

Many thanks also to the shooters whose SCATT files I have used in the compilation of this document. You may be able to recognise some of the diagrams from your work.