

## QUESTIONS and ANSWERS

Debate over eTarget accuracy without accurate data is meaningless and divisive. Information is sparse or non-existent and what exists is often partisan. Assumptions are common, and myths abound.

To aid both shooters and organisers, the NQRA decided to run tests on both New and Used eTargets before the 2016 Queen's Shoot. These tests have been carried out as rigorously as one would assess and calibrate any precision measuring instrument.

Detailed results are elsewhere, but some obvious questions may be answered in the following.

### WHY TEST KONGSBERGS

**Q/ I see that all of the targets tested were Kongsbergs. Why was this ?**

*This test was specifically of the NQRA targets used last year at the 2015 NQRA QUEENS shoot plus three recently acquired new ones. There were some serious issues last year with using the electronic targets and we wanted to know once and for all the measured accuracy of new, lightly used, and very badly degraded targets.*

**Were the issues accuracy related or communications related ?**

*In retrospect, it would seem that communications issues were causing many problems at the longer ranges. This has been addressed with a serious upgrade of Antenna and Cabling and better and higher positioning. The changes are overkill but should guarantee that nothing more can be done to improve communications !*

**Well, what about the accuracy ? Were there any problems ?**

*In the light of the present tests, and knowing nearly all the targets used last year were new, it is highly unlikely that accuracy was an issue. Unfortunately, a few extra older targets were pressed into service because of numbers and maybe this could have been better, but, again, in the light of the present results on a very degraded target, I doubt they would have been as bad as some imagined. With three new targets, there is no chance of that happening again.*

*The bottom line is that, because no one has definitively tested Kongsbergs that I know of, no one could estimate the accuracy with any certainty.*

## ACCURACY

**Q/ I thought it was established that Kongsbergs were accurate to 0.65 mm ?**

*That was a figure claimed and bandied around for years. It was on a web site but has been quietly taken down now. To my knowledge it was never specifically claimed by Kongsberg. Do you believe it ?*

**SILENCE**

**Well, if it is not 0.65 mm, what is the accuracy of a Kongsberg Target ?**

*It is impossible to answer in one word. We are dealing with many randomly distributed errors and must consider average error and even more important is the frequency of different error values. We must consider Averages and Error Distributions and Standard Deviations and the number of shots in any the test attempting to measure its accuracy.*

**OH, NO ! You are going to bring in statistics. No one understands or trusts Statistics !**

*But Shooters use Statistics to advantage all the time. No one would dream of selecting a winner on 3 shots so in a Queens shoot more like 100 shots are used to evaluate the results of each shooter. That is a sensible use of statistics.*

*The WORST air disaster killed 583 people. Yet flying is safer than driving per hour per person. This is true without any dodgy Statistics and people have obviously made this judgement because they still fly.*

*You must consider the FREQUENCY of these extreme events and the AVERAGE number of people killed in each event.*

*As long as there are sufficient shots measured, Standard Deviation is the most satisfactory way to measure and compare the variability of an entire range of data with maximum objectivity. Fixating on the extreme limits of errors may tell you what once happened but is almost useless in attempting to predict future performance.*

**You have not answered the question. What accuracy can be expected from a new Kongsberg?**

*I suggest you go through the report on each target in detail. But I will say that our results indicate that for a 6x6 ft H1H Kongsberg target in very good condition used as we did at 880 yards, errors were usually 1 to 2 mm, sometimes less than 1 mm and occasionally over three mm.*

**And you can back up those results ?**

*Yes. But we only ran 30 shots in each test. You are welcome to run more definitive tests and*

*I would love to see the results.*

**Could an error be worse if a lot of shots were involved ?**

*Of course. Larger errors are far less likely but will occasionally occur. But I would point out that a 10 mm error at 880 yards is 0.04 minute or 1/25 of a minute.*

**Is this error acceptable ?**

*That is a whole new question and has to be decided with respect to the intended purpose of the target. It must also be considered alongside alternatives like paper targets and any errors expected from them. This has been about objectively measuring accuracy, not criteria for different target uses.*

## ACOUSTIC CENTRE

**Q/ I see that Acoustic Centre was sometimes 15 mm. You have made little mention of Acoustic Centre error. Why ?**

*The centre of a group when a person receives each shot position error is simply shifted by appropriate sight settings. For some types of shooting where 1 shot kills are required it is more important. None of the targets tested showed any excessive centring error at 800m. Also, the worst errors were in elevation which is less critical than the X error.*

**Surely, 15 mm is a large error ?**

*Well, it is 1/15 minute at 800m which is way smaller than the smallest sight clicks anyone will be using. It is about ½ of the smallest scope click ever used.*

**Are you saying that Acoustic Centre Error never matters ?**

*No. It must be kept within limits, but that depends on the application. For personal shooting at a typical Queens the only time I can think of where it may matter is if a person was moved from one target to another during a shoot for some reason. If the centring error is large enough, his zero will be different. Especially at the shorter ranges. Of course, care is needed when aiming marks are attached to any target to keep this centring error under control. But in all of these tests it is almost trivial.*

## NUMBER OF SHOTS

**Q/ Why did you use 30 shots ?**

*A small number of shots is neither fair to the Target nor the Shooter just as assessing a shooter on a few shots is not reliable. Thirty is often accepted as a minimum in statistical studies. More would be better but there is more chance of shots so close together that no one knows which is which and both have to be discarded. It also involves a lot of shooting time, ammunition, barrel wear, and sweat on the mound.*

*You are quite welcome to replicate these tests with more shots !*

## TESTING DISTANCE

**Q/ Why did you shoot from 800 m when 900 m was available.**

*If you had been shooting would you have used your best rifle and ammunition ?*

**No. Not for 100 or more shots for a simple test!**

*And how many X's would you have managed in 30 shots at 1000 y with that gear ?*

**Probably not many !**

*So, how many shots could you accurately place close to the edge of a 4 ft. sheet of Corflute on a 6 ft target at 900m (1000y) without spilling off the sheet or endangering a sensor ? Remember, we were trying for shots distributed from centre to edge of the sheet. Also remember there were a total of 230 shots !*

**OK. But do you think the test from 880 yards was adequate ?**

*I would love to see results from 1000 y, but I believe the tests were very thorough and representative of a Queens shoot. Perhaps you can gather the data for a similar 230 shot test at 1000y.*

## CALIBRE

**Q/ I see that you tested with a 308. Surely you should have tested with the smallest rifle approved for a Fullbore or FTR event which is a 223 ?**

*How many people do you know shooting a 223 ?*

**A few.**

*And how many shoot it at 1000y or 900 y.*

**One or two. And they sometimes win with the 223.**

*Yes, and they shoot very hot loads to stay competitive and their barrels usually have a rather shortened life.*

**Yes, but why not get them to do the test firing ?**

*We shared shots between 3 rifles. This gave time to cool down and minimised barrel wear. Are you asking someone to put 230 hot loads through their pet 223 barrel ? It is hard enough getting together a few shooters to do any testing let alone ones with a suitable 223.*

*I see that you have won the occasional long range shoot using a 223.*

*Would you volunteer next time to load 230 hot loads and put them through your rifle ?*

**Silence.**

*No. And it would not be right for me to ask it of you ! And another thing, if FS is phased out in favour of FTR, no one will ever seriously use a 223 at long range. And hardly anyone does it in FS even now. You are very welcome to repeat these tests using a 223 !*

## **LOST SHOTS**

**Q/ Did you have any missed shots ?**

*No. But why do you ask ?*

**Well, obviously, one is very interested in how reliably the target works.**

*Of course. But 30 shots proves very little about reliability.*

*It might show terrible reliability, but 30 shots could never prove unreliability where we are looking for no lost shots in many thousand fired.*

*Reliability is a different issue from accuracy and needs thousands of shots to assess.*

**Are you saying that there is no way to test for reliability.**

*Not with a few shots. But records kept over thousands of shots will give you that answer. Accurate records are very important.*

## **TESTING REGIME**

**Q/ Should others use a similar testing regime ?**

*Not necessarily. This test was meant to be as definitive as our resources allowed. It was a lot of work and it would be totally unrealistic to perform on, say, 30 targets. But it may be a very good idea to apply to a small sample of targets to gather reliable information. For example, the 6 x 8 targets.*

**So, how can we ensure that electronic targets used at a Queens Shoot are satisfactory ?**

*My feeling is that the relevant body needs to show some evidence that they have taken steps to ensure this. This will involve keeping accurate records of shot numbers, type of shooting discipline, ranges shot, and target maintenance as much or even more than test shooting. It must be transparent.*

**OK, how many shots can we expect before major maintenance is needed ?**

*Totally depends on the type of shooting. But it is worth remembering that accuracy has improved dramatically since the first development of electronic targets so I think figures suggested by the Target manufacturers may be optimistic.*

*A Queens shoot adds a lot of shots close to the centre ! F shooters place most closer to the centre. So there is a much higher concentration of shots closer to the centre of the target than in lower level club shoots.*

**Is this target degradation new knowledge about electronic targets ?**

*Not really. A number of key people have been warning about this.  
But what may have changed is that increased shooting accuracy may have reduced the number of allowable shots significantly before serious maintenance is needed.*

## **SUITABILITY**

**Q/ Are electronic targets good enough for really critical applications. Such as, for example fine rifle testing, ammunition testing and ladder tests etc ?**

*Targets in very good condition are certainly good enough for this. But why do you specifically mention test shooting ?*

**Well, surely this places greater demands on the target when the exact position of each shot is critical rather than simply being used for score.**

*No ! With the present scoring system, the accuracy of an electronic target for high level competition is even more critical.*

**How can the scoring system matter ? There are huge blank areas between scoring lines where it does not matter where the shot is, but with rifle testing every shot position is critical and need to be measured.**

*Yes. So you throw away the information carried by all of those shots for ranking shooters in order and only concentrate critically on one small area of the target. The winner in a calm weather Queens shoot is determined solely by one ring. The dividing line on the outside of a centre. If an error crosses that dividing line then scores change.*

**But some scores rise and some fall, surely they average out.**

*Yes, averaging can occur, but this is only true if a very large number of crossings occur. Remember there is only one ring making the decisions and the measurements on shots elsewhere is being thrown away.*

**Well, why not go over to a 10 ring target ?**

*The present 10 ring target as used in the US does nothing to solve this problem. In fact, the shorter distance ICFRA targets have smaller rings. It is the number of rings used to make the decisions close to the target centre that is critical. Many more are needed close together near the centre.*

**But we cannot fit in more rings. They clutter up the sighting picture and it would be impossible to mark on a target like that.**

*Not to an electronic target where scoring 'rings' are simply sizes held in memory. You can have as many as you like. Of course, they would not be shown on the target face – only an ideal aiming mark would be on the target with some standard well visible and well thought out rings for scope aiming. With enough of these rings, averaging of errors crossing lines does come into play and the target accuracy does not need to be as good to resolve a winner.*

**That is far too radical !**

**There are even more radical and better schemes available with electronic targets !**

**Shooters would never accept it ! I would never shoot under that system !**

**Perhaps ! But running a State Level shoot on electronic targets using the present scoring system requires almost perfect targets. Are you prepared to put your hand up to do the required target maintenance to ensure perfection ?**