



RANGE PLANNING GUIDE



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PURPOSE OF THIS MANUAL

The purpose of this manual is to provide the prospective E-Target range with the tools and concepts necessary to effectively evaluate if Electronic Highpower Targets are right for you. There are detailed sections with specific information on every aspect of initial evaluation, including feasibility, target types, evaluation criteria, Business Case essentials, implementation and installation expectations, infrastructure considerations, and financial implications.

E-TARGET SYSTEM FUNDAMENTALS

In an electronic target system, bullets are located and measured by acoustic sound waves. Measurements of those sound waves are converted to X & Y coordinates, and transmitted to a firing line display device, which shows bullet impact superimposed on the correct target face.

This revolutionary development offers major, fundamental changes to the sport of Highpower Rifle Shooting. Nearly instant display of shots fired on a display device right at the shooter's fingertips, means there is no necessity for pit duty or pit relay changes. This drastically shortens the time requirement for a typical match, as well as significantly reducing the physical requirements for older or physically challenged shooters. It also provides a much more enjoyable "instant feedback" environment more consistent with faster run-and-gun sports.

In various target designs, sound waves can be supersonic or subsonic, depending on the design of the target. Silver Mountain Targets manufactures a state of the art open sensor system, which requires supersonic bullet travel, has very low impact on existing range infrastructure, and provides the best bang-for-your-buck of any E-Target system.

SYSTEM DESCRIPTION & PARTS IDENTIFICATION

1.1 Targets

In a typical E-Target system, the targets are the heart of the bullet sensing functions, utilizing state of the art acoustic sensors to measure shot location, angle, and speed. The targets typically consist of 4 dual microphone sensors (8 total mics), mounting hardware, and cabling.

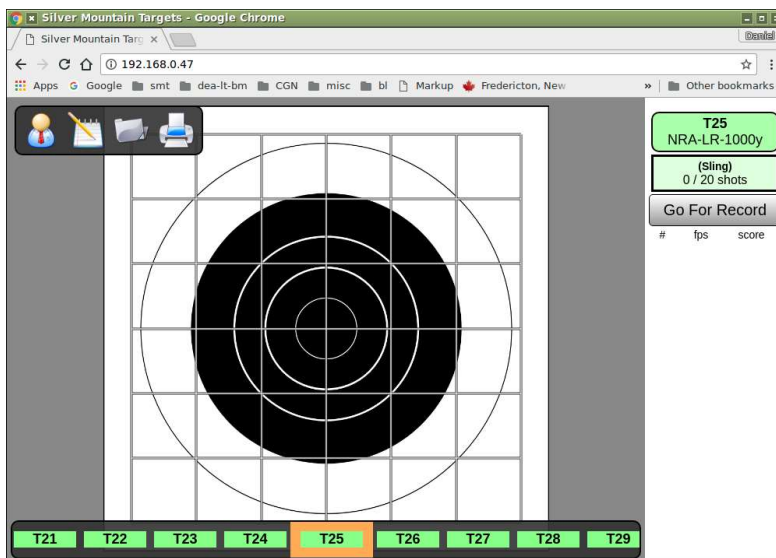
Microphone sensors can be mounted on existing target frames, custom made frames that improve sensor geometry, or built into the range design for new ranges. Targets do not require pit raising and lowering mechanisms, so for new ranges they can be permanently mounted behind a low berm wall that protects the lower sensors and Target Controllers. Being weatherproof, todays state-of-the-art system can be left out 24/7/365 if desired.



1.2 Target Controllers / Servers

Depending on the number of targets being configured, some sort of Target Controller is needed to coordinate the raw sensor readings, and transmitting those readings via an uplink radio to a computer. In a larger multi-point range, the configuration may be a multi-point target controller communicating to a Server on the line. In smaller configurations, it may consist of a combination controller/server at each target, transmitting directly to line display devices

Either of these configurations typically present the shots on a self-created web page displayable on a Target Display device.



1.3 Power Requirements

A modern system will reliably operate off main power (120VAC), battery power, or even solar cells, reducing un-needed burden on the range, minimizing routine maintenance, and limiting potentially huge costs for infrastructure upgrades.

SO, WHAT'S THE BIG DEAL? WHY SHOULD WE CONVERT

Converting an existing Highpower range may seem like a daunting undertaking. You might be thinking “after all, we’re doing just fine with our pit targets”. However, there are other considerations to evaluate when thinking about this potential change.

Many ranges are seeing steady or declining attendance, especially by younger shooters. The firing line averages an older age each year. To stem the flow of declining attendance, a forward-thinking range needs to attract more shooters. More shooters may mean more income, which means a healthier range operation.

So just how do you attract more shooters? There are a couple simple answers to this question.

2.1 Attract More Highpower Shooters

Attract more of the already committed Highpower shooters. These are the people that are regular shooters. Get them to come more to your range, and to generally shoot more matches. Having a state-of-the-art electronic range will improve these numbers.

2.2 Attract More Non-Highpower Shooters

Other shooting disciplines seem to be growing faster than Highpower. There are many reasons for this, but one way to increase attendance at Highpower matches is to attract shooters who are not currently involved in Highpower. Typically, these newer shooters are more interested in faster match times, more rounds down range, and more high-tech systems. The E-Target system will be more attractive to many of these shooters.

2.3 Physically Challenged or Elderly Shooters

There is a group of shooters who have aged to a point of not being able to meet the physical demands of a typical Highpower match, especially in hot weather. There is also a group of shooters with some sort of physical challenge that would prevent them from shooting a typical Highpower match. In most cases, both groups can participate in a match on E-Targets.

2.4 Offer More Types of Matches

Another factor weighing into declining attendance, is the typical Highpower course of fire and rifle requirements. Offering a broader array of matches, such as Prone, mid-range, or long-range matches, can bring out the shooters that aren't interested in Across-the-Course matches, or that don't have a rifle that fits the requirements of rapid fire.

2.5 Attracting the “Nintendo”® Crowd

This affectionate nick-name was coined to classify the crowd of shooters that want fast action, short duration matches. You’ll see this in the up-swing of attendance at many pistol and 3-gun matches. Making a structural change in Highpower matches, shortening the time required, speeding up the entire process, and providing more shooting for the amount of time invested will attract more younger shooters, and shooters who may not be able to commit to an entire day on the range. These shooters are also more attracted to the high tech atmosphere of an E-Target match.

2.6 Competing with Other Ranges

You might not think of competing with other ranges in your area. You might not even have other ranges within an hour or two drive of your range. However, have you considered what will happen to your match attendance, when shooters realize they really like shooting on E-Targets (with no pit duty)? What will happen when these shooters decide they have a day free to shoot a match, and begin to look for ranges that utilize E-Targets? Will shooters tend to gravitate to E-Target ranges, leaving your matches under-attended?

ARE E-TARGETS RIGHT OR FEASIBLE FOR OUR RANGE?

3.1 Implementation

There is not a range in the US where E-Targets could not be effectively implemented. They are perfect for new range construction, since you don’t need to build a pit or have mechanical target mechanisms. They are also easy to install and operate on an existing range with mechanical carriers. Ranges have successfully installed E-Targets with firing points from 1 to 50 or more.

You’ll find a list of considerations in other sections of this document, that will assist you in deciding if the cost and time commitment is worth it. However, don’t lose sight of the fact that without moving to E-Targets, Highpower at your range may dry up and wither on the vine.

3.2 Feasibility

If you have existing target pits and mechanical carriers, you can implement E-Targets. If you have no pits, it’s even easier, since the E-Target doesn’t have to be moved. It can be permanently installed and left out 24/7/365.

One consideration is the actual number of E-Targets you’ll want to install. For example, if your range has 10 firing points, you may not have to install 10 E-Targets. You could get by with fewer, since match times will be significantly reduced, and more shooters can be cycled through in a typical day. However, if your goal is to increase attendance, you might want a full deployment of all 10 firing points, giving you the flexibility to implement some of the strategies in this document, and if successful, be able to handle the larger crowds.

TARGET SYSTEM DESIGNS

There are two basic design concepts separating E-Target manufacturers. Open System, and Closed Chamber Systems.

4.1 Chamber Target Systems

Chamber targets systems utilize a closed sound chamber. Advantages include handling subsonic or supersonic bullets and a slight improvement in accuracy. Disadvantages include heavier weight, more difficult installation, and higher routine maintenance costs. Additionally, many chamber target manufacturers utilize proprietary display devices increasing up front purchase costs, and adding significantly to the burden of system storage and maintenance.

4.2 Open Sensor Target Systems

Open sensor target systems such as Silver Mountain, mount sound sensors directly on existing target frames. Advantages include a simpler installation and virtually no routine on-going maintenance costs. In the case of Silver Mountain, there is the added benefit of reduced up front purchase cost and maintenance costs by utilizing user-supplied display devices. Disadvantages are they require supersonic bullets.

EVALUATING E-TARGET VENDORS

5.1 Criteria for Evaluating Various Systems

When evaluating target designs, the following criteria should be considered.

- **Initial Target System cost.** This is the purchase cost of the targets, comms, servers, display devices, cables, batteries, and any other required components.
- **Range infrastructure changes.** This includes costs and time commitments. This includes power requirements, target frame modifications, Comms or WIFI installations, and storage requirements of targets, servers, and display devices.
- **Accuracy requirements.** Is the published accuracy of the Silver Mountain Target system of 3.2mm (1/8" at any distance) acceptable? Do I need a system that boasts "better accuracy" but costs significantly more? For a discussion of the impacts of "accuracy", see section 9.1 below.
- **Routine maintenance.** Chamber targets are most accurate when the face material is fresh, and accuracy declines with the number of shots on the target. This means there are on-going future maintenance costs and time commitments to consider. Open sensor targets have virtually no on-going maintenance requirements to maintain initial accuracy.
- **Repair costs and capability.** Does the target need to be sent off for repair, or can it easily be repaired by non-technical on-site personnel? Do you have the expertise to do any repairs?
- **Proprietary vs. Open Target Display devices.** Does the system require proprietary display devices, or can it utilize any WIFI capable laptop, tablet, or smartphone? What are the added costs for purchasing Display Devices, and on-going maintenance, repair, and storage of those devices?

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- **Total Cost of Ownership.** This incorporates many of the items above into an annual cost of all factors.
 - **Workload.** This includes typical match setup, tear down, and between match workloads such as storage, battery charging, target repair, etc. It's important not to overlook the workloads required of each system. On many Highpower ranges the work is done by just a couple dedicated shooters. If the setup, tear down, and between-match work requirements are more than they can (or wish to) take on, the new system implementation won't fly.
 - **Installed Base.** How many systems or lanes of targets does the manufacturer have in the US? Silver Mountain Targets has nearly 10 times the number of installed targets of its closest competitor. A large number of users indicates a proven and stable system architecture, and superior customer service, both important considerations in your long term operation of the target system.

BUSINESS CASE

6.1 Fundamentals of a Sound Business Case

Many factors play into an effective business case to justify the expenditure for E-Targets. Silver Mountain Targets can assist in developing a winning business case and proposal for purchase of an E-Target system.

- Increased attendance from the Hi-Tech nature of E-Targets
- Increased attendance from attracting non-Highpower shooters
- Increased attendance from faster and less physically demanding matches.
- Providing access to physically challenged shooters.
- Increased attendance from additional match types drawing different and more shooters
- Staying on the forefront of technology, keeping up with the future of the sport
- In a multi-discipline club, providing access to all members of at least one target. This is invaluable for non-match types of shooting, like load development and sighting in that hunting rifle.
- Analysis of regular yearly budget expenditures such as targets, pasters, cardboard, glue, etc.

TARGET IMPLEMENTATION

7.1 What Can You Expect Deploying a System

Depending on the system design purchased, implementation can be varied. Purchasing an open sensor system such as Silver Mountain Targets, minimizes the implementation concerns.

Infrastructure changes are minimized, since the system can operate off of battery or AC power, and is completely self-contained as far as WIFI communications. There is nothing required in the way of installing power or comm lines.

In many instances, target components can easily be mounted on existing target frames, further simplifying implementation.

Silver Mountain Targets can assist in developing a list of implementation considerations for your specific range.

7.2 Setting the Stage at My Club

In a multi-discipline club, various shooting disciplines are typically competing for capital funds. It's important to show some benefit to all shooters, and to build a consensus of support for the proposal.

It may also be wise to discuss the future of the sport, and make an analogy between this upgrade and other discipline upgrades previously done at this range. These may include upgrades to trap or skeet machines, upgrades to steel or moving targets, additions of handicap accessible features, and covered firing points for inclement weather.

Silver Mountain Targets can assist in developing a game plan for your specific range.

ACCURACY

8.1 Just what is “Accuracy” on an E-Target?

There are two primary types of “accuracy” to discuss, relative to shot placement on E-Targets

First is accuracy of the plotted hit, from shot to shot. Assuming 2 shots are fired in exactly the same place, the system must be able to score and plot those shots with the same value and location. Silver Mountain Targets specifications are 3.2mm at any distance. This means the accuracy at the target is +/- 0.126”, or about 1/8 of an inch, or about 1/2 the diameter of a .223 bullet.

Second is the accuracy of all shots, as far as actual location on the target. This is much less important for a couple of reasons. As long as condition one is met above and the target has the ability to repeatedly score individual shots relative to each other, then the fact that all shots are scored slightly right or left of its actual location on the paper is really much less important. The range administrator would calibrate the target, so the actual center of the target corresponds to the acoustic center. This is a simple process in Admin mode of the target software.

An important paradigm shift with E-Targets is to realize the physical pit-mounted “target” is not really a target, it's just an aiming point. Your official target is now your display device. Your score is what's displayed.

8.2 Accuracy vs. Time and Money Expenditures

An important part of the evaluation must be the cost of the level of accuracy desired (in both money and time commitments). Some chamber target system that are very expensive, tout their slight increase in accuracy with no regard to the reality of total system cost of ownership.

Just how accurate do you really need to compete with the paper target system. What's the average level of your typical competitor? Do you have F-Class shooters? How much work do we want to (or are able to) put into frame mounting, wiring, cables, storage of hardware, etc.? Dedicated display devices require dedicated storage and charging facilities. How much routine maintenance are we going to have to do on a monthly or annual basis? And lastly, and possibly most important, is the fact that a Silver Mountain Target with published accuracy of less than 1/4" is as accurate as most paper targets, with off-center repair centers, incorrect printed dimensions, or stretching from too much paste.

WHAT'S NEXT?

Once you have decided an E-Target upgrade is right for your range, Silver Mountain Targets has a "Range Design & Installation Guide" that will assist you with the many details you'll need to address.

- Frame setup
- Sensor mounting
- Firing line to target alignment
- Replaceable target centers
- Pit wiring
- Other infrastructure changes
- Maximizing the accuracy for your system



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