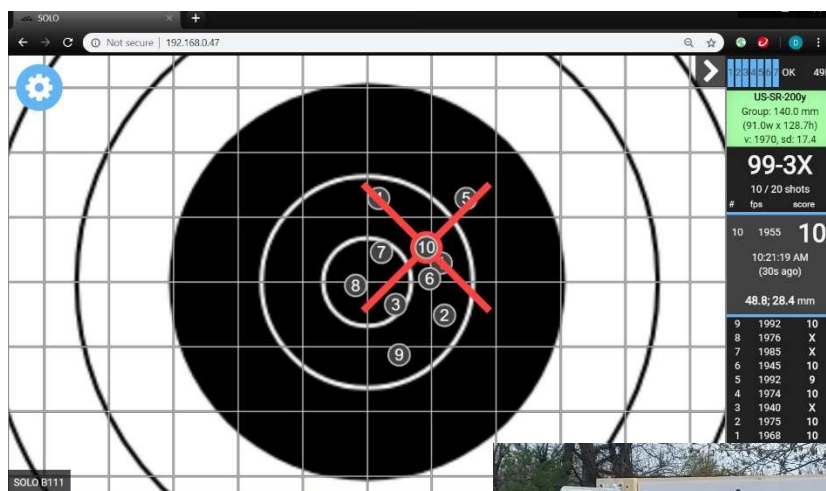




SOLO USER GUIDE



Silver Mountain Targets, Inc.
Rev 2.20 June 1, 2019

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PURPOSE OF THIS MANUAL

The purpose of this manual is to provide the **SOLO** system owner the tools and training necessary to effectively setup and operate the Silver Mountain **SOLO** target system. It includes hardware configurations, hardware setup, and installation.

SYSTEM DESCRIPTION AND PARTS IDENTIFICATION

1.1 Microphone Sensors

The sensors are the heart of the bullet sensing functions, utilizing state of the art acoustic elements to measure shot location and speed. The sensors consist of 4 dual microphone sensors, mounting hardware, and cabling.

The sensor elements can be easily removed if desired, since they incorporate a quick-slide mounting block. The base stays mounted to the target frame, and the cables connect to the bottom of each sensor element.



1.2 Target and Firing Line Controllers

The target controller in the **SOLO** target system is called **T-SOLO**. It coordinates all sensor readings, transmitting those readings via a WIFI antenna to the firing line device, called **F-SOLO**. The **T-SOLO** has connections for the 4 sensor cables.

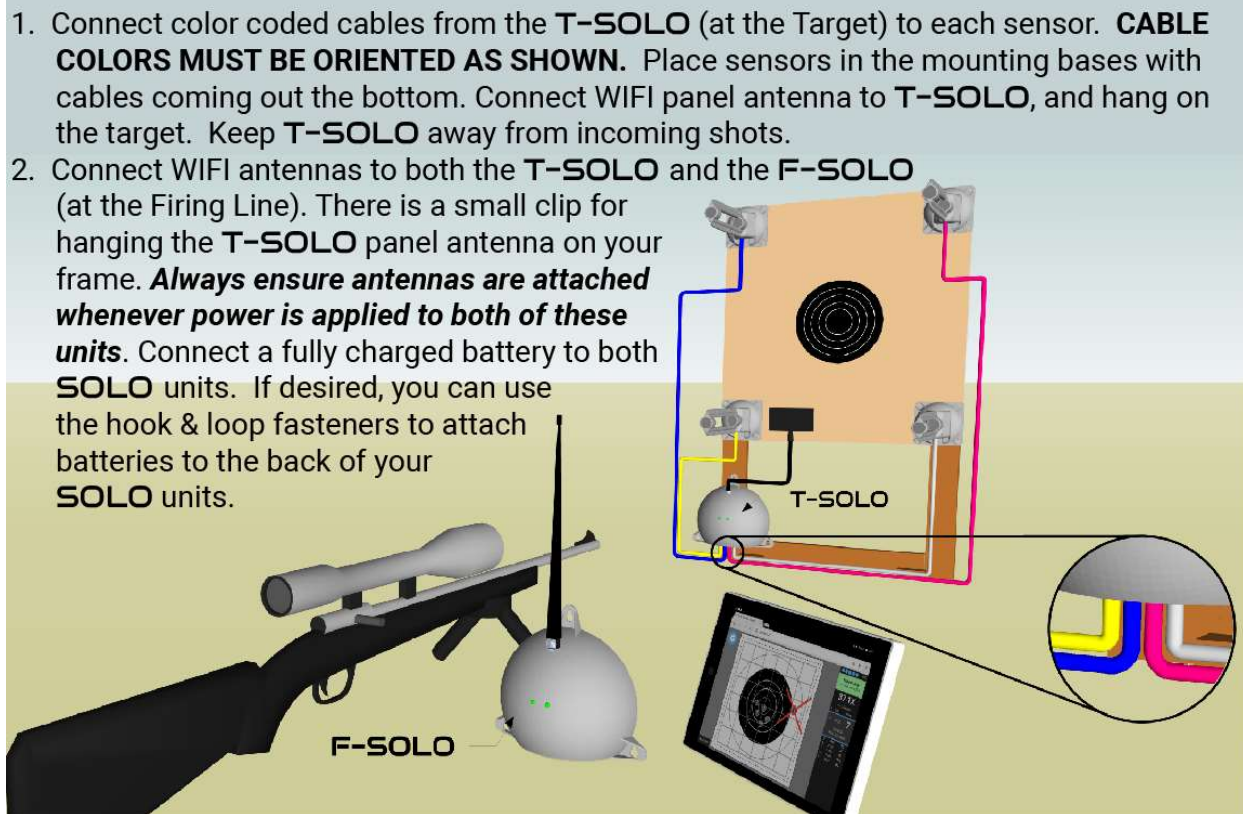


1.3 Software

The main software is the brains of the target system and is housed in the **F-SOLO**. Data is transmitted via the WIFI radio from the target to the **F-SOLO**, which sits on the firing line. The **F-SOLO** also provides firing line access to the shooter via his/her display device. The software provides the shooter complete control of the system, as well as shot location on the target face, shot value, XY coordinate position, and velocity at the target.

1.4 System Diagram

The entire system is easy to connect and easy to operate.



SAFETY

SAFETY IS YOUR RESPONSIBILITY
SAFETY MUST BE THE FIRST AND CONSTANT
CONSIDERATION OF EVERY PERSON WHO HANDLES
FIREARMS, AMMUNITION & SILVER MOUNTAIN TARGETS

1. Make sure all firearms are unloaded with breech open when any work is being done downrange on the target frame.
2. Be sure of what's beyond your target before you shoot.
3. Wear shooting glasses and hearing protection when you shoot.
4. External battery packs may contain lithium batteries which should always be disposed of properly. Be sure to remove batteries when the target is not in use, and keep them fully charged when stored.
5. Service and maintenance of any device is only to be performed by an authorized Silver Mountain Targets dealer. Any tampering or modifications will void the warranty.

HARDWARE SETUP

2.1 Target

The SMT system can be used with both conventional, manually operated targets, and fixed or portable target frames. The microphone sensors, **T-SOLO**, and WIFI panel antenna are attached to, or near the target frame.

Target Frame

The **SOLO** target system can be mounted to your existing frame, if the frame is rigid and stable in the wind. If you need to build a frame, please go to www.SilverMountainTargets.com for suggestions and plans.

SOLO Microphone Sensors

In the **SOLO** system, there are 4 sets of dual microphones (8 sensors total) enhancing the measurement capabilities of the system. Each dual mic sensor assembly contains a unique quick-slide mounting block allowing the user to easily remove the sensor elements for storage.

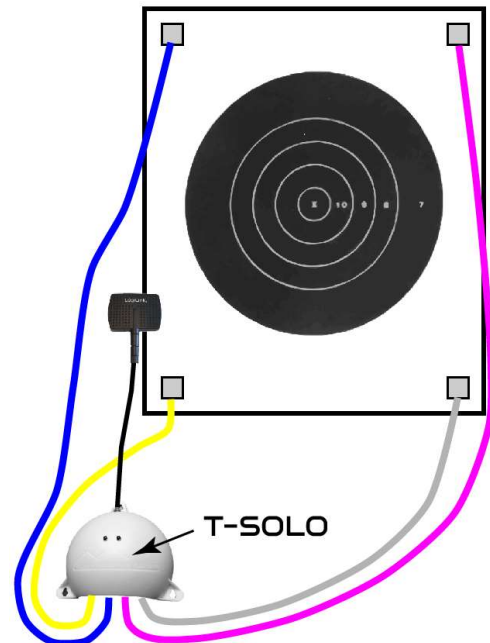
For instructions on sensor mounting, refer to the **SOLO** Quick Start Guide available at www.SilverMountainTargets.com.

When installing sensor mounts, remember to record the width and height spacing as instructed in the Quick Start Guide. You'll enter these numbers later into the system.

2.2 T-SOLO & WIFI Antenna

The **T-SOLO** must be protected from bullet strikes, and should ideally be below grade, or behind protective cover. Typical installations locate it near the bottom of the target, below grade, but close enough to allow connection to the target frame. Connect the WIFI panel antenna with the printed name facing the firing line. Connect a fully charged battery to the battery port. Connect the sensor cables to the sensors and insert the sensors into the mounting bases with cables oriented as shown here.

The WIFI antenna must have clear line of sight to the firing line. It is recommended to be placed on the side of the target frame, as shown.



ANTENNAS MUST BE ATTACHED WHENEVER POWER IS APPLIED. ATTACH ANTENNAS BEFORE POWER, REMOVE POWER BEFORE ANTENNAS.

2.3 F-SOLO

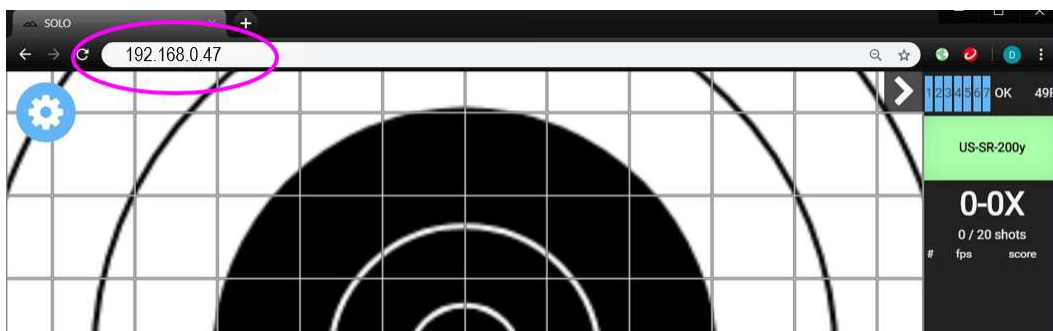
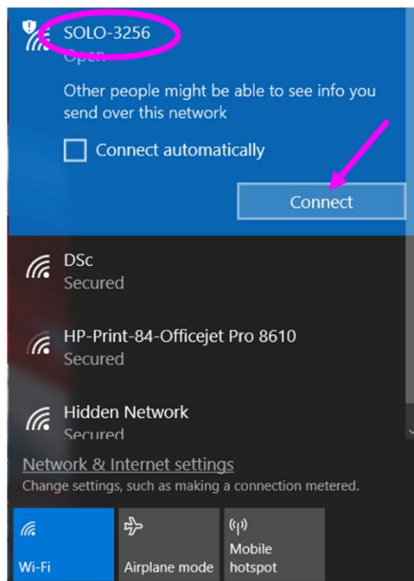
The **F-SOLO** communicates with the **T-SOLO** and is the access point that the shooter connects to with a WIFI capable device. Connect the folding omni antenna and a fully charged battery to the battery port and position the antenna in a vertical plane. It needs clear line of sight to the target antenna and must be shielded from muzzle blast.

2.4 Display Devices

The user-provided display devices can be any WIFI capable device, such as a laptop, tablet, or smartphone. The SMT software is touch-screen optimized but can also be used with a traditional mouse or touchpad setup.

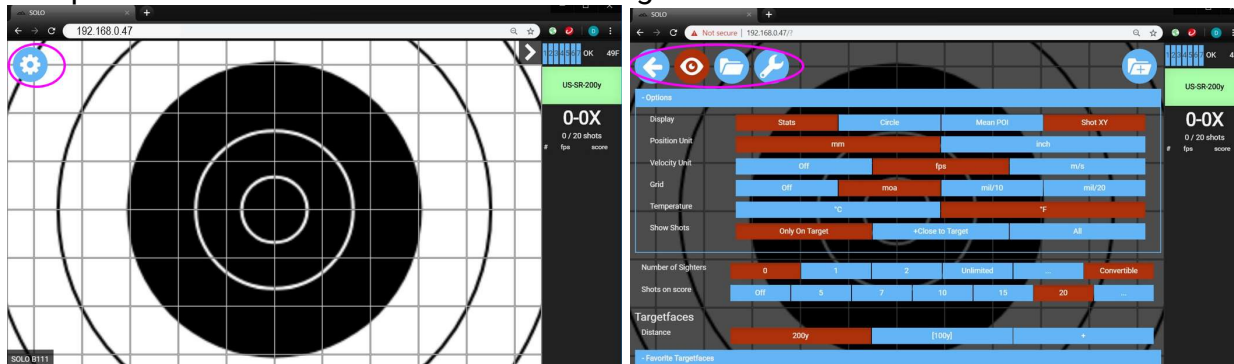
2.5 Connecting to the WIFI

Once all the hardware is installed and connected, including both antennas, you're ready to connect to the WIFI system. With any WIFI compatible device (laptop, tablet, smartphone, etc.) go to WIFI settings and choose the "SOLO-XXXX" network, where XXXX is the serial number printed on your **SOLO** units. Open your internet browser and type the IP address "192.168.0.47" into the address bar. You should now see the target viewer screen.



SOFTWARE OVERVIEW & MENU STRUCTURE

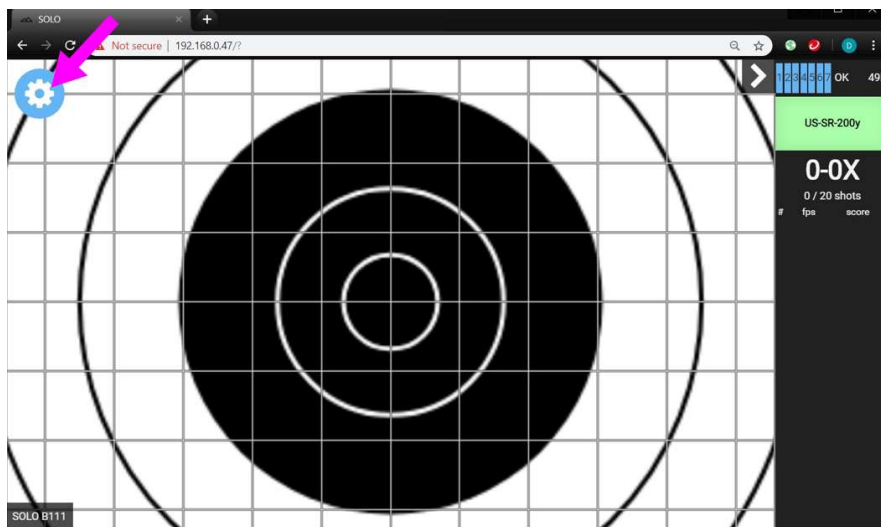
SOLO incorporates a simple menu system. This allows the user to more easily navigate the system, while still having access to high end functions. In this menu structure, there is only a single **Main** menu or “Gear” icon on the screen providing an uncluttered view of your target and ShotsList Column. Selecting the gear icon opens the **Main** Menu, which contains a **Back** button, **Options**, **Storage**, **Tools**, and **Save** icons that provide access to all features and settings.



3.1 Main Menu



This **Main** menu icon looks like a “Gear”, and is always visible on the screen, accessible at all times. Selecting this **Main** menu icon will expand a settings menu across the screen. This expanded menu has a back button, and 4 sub menu buttons for various tasks and settings, and when selected defaults to the **Options** Menu, the “Eye”.

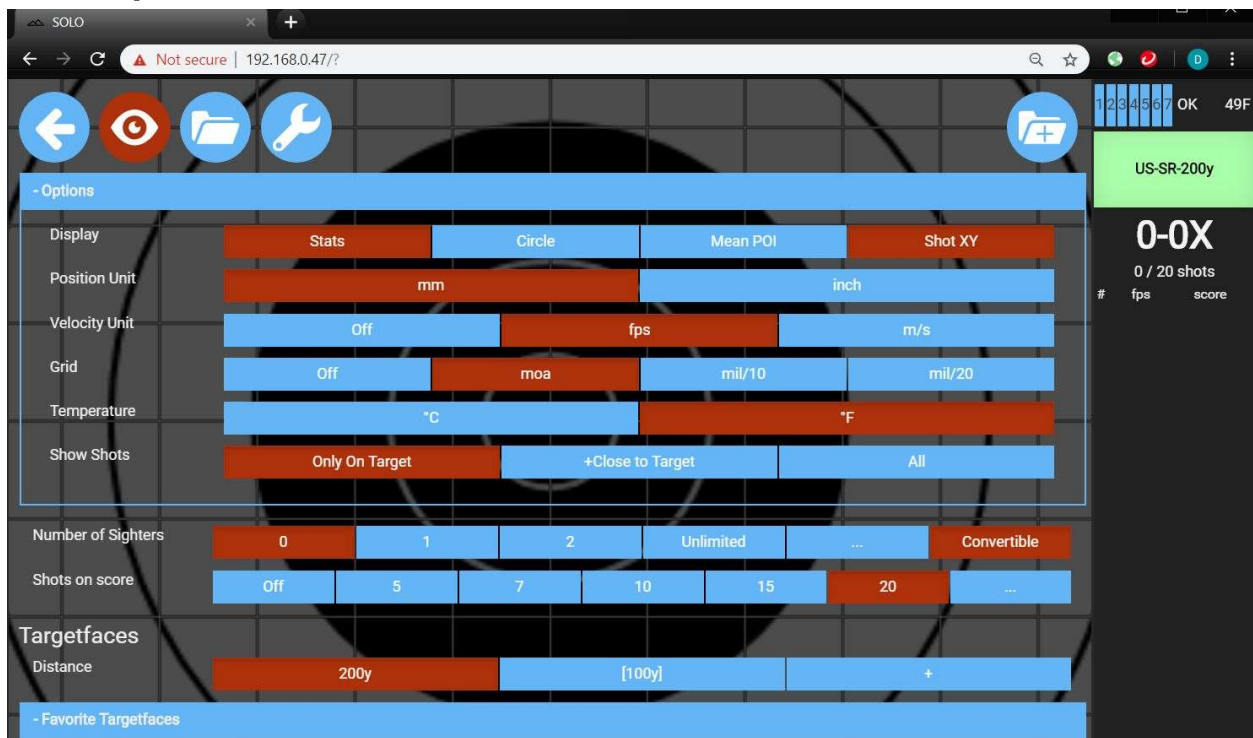


3.2 Back Button



Hides the expanded set of menus and takes you back to the target screen and **Main** Menu

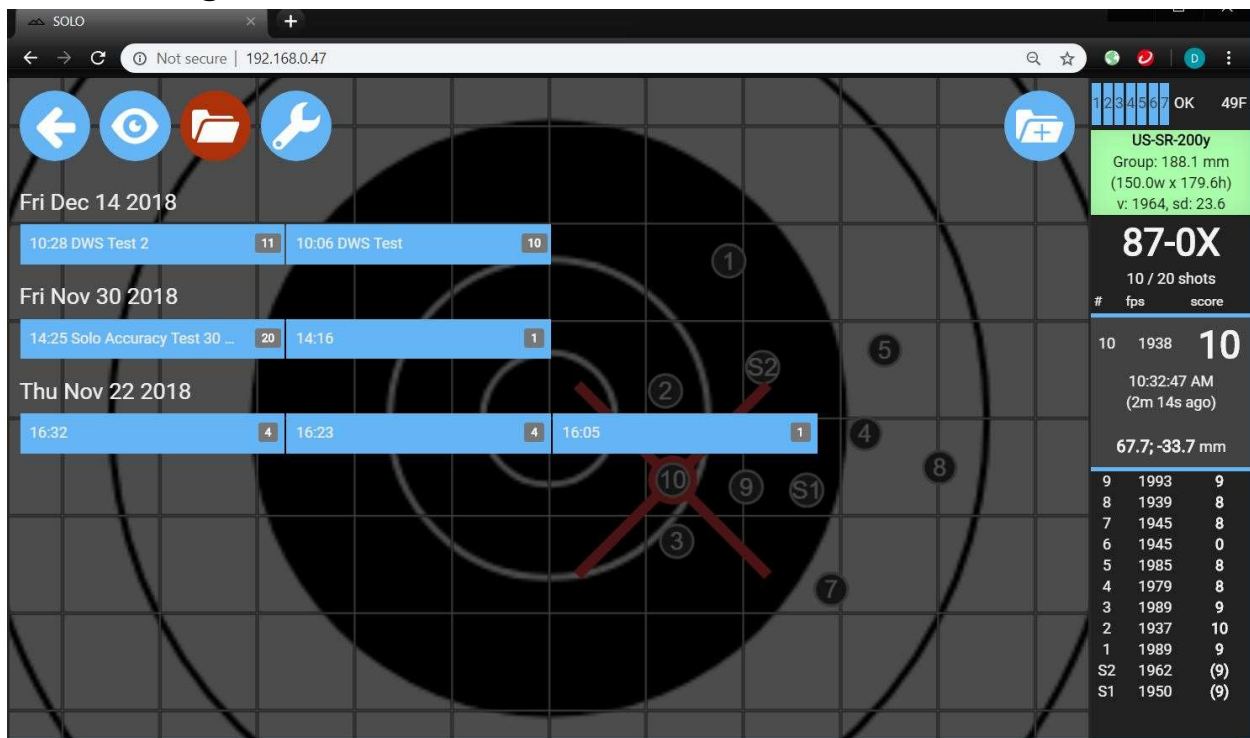
3.3 Options Menu



The **Options** Menu looks like an “Eye”, and represents things that you see, like Display options, Position, Velocity, and Grid units, and Language. It is also where you select the target face you want displayed, and the yardage from which you’re shooting. When selecting the target face, you’ll see they are categorized by type, such as “NRA”. You can delete a target face by selecting it (turns red) then selecting the “X”. It should be noted that deleting a target face will also delete any saved strings that were shot on that target face. If you select a target so it turns red, you can also select the star to add it to your favorites. Favorite target faces are kept in a category at the top for convenience.

Note that there are some options to be set on this menu screen, that are normally collapsed. Press the + next to the word Options on the first line to expand these as shown above.

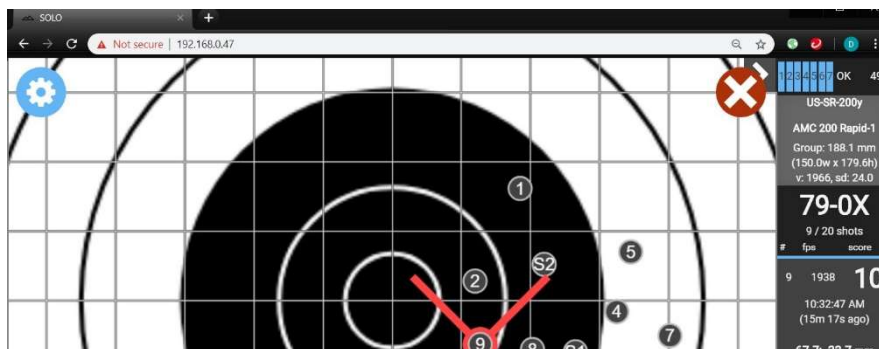
3.4 Storage Menu



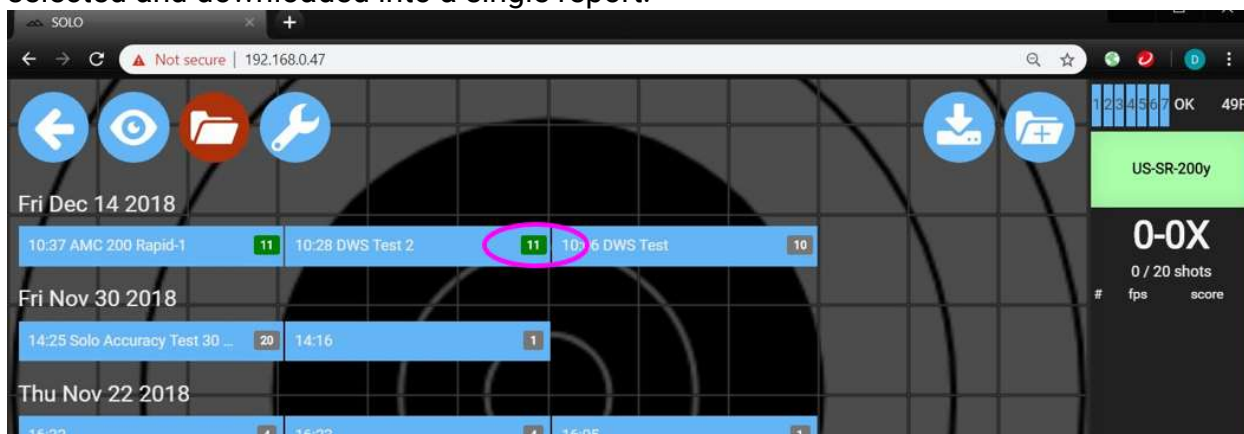
The **Storage** Menu looks like a “Folder”, represents archiving, and provides access to saved strings of fire. If there are multiple pages of saved strings, they can be selected with the page bar near the top. Saved strings are categorized by date, show the name that was entered when the string was saved, and indicate the number of shots in the string.

To select a saved string for review, simply select it from the storage location. Press the back button to remove the menu so you can view, expand, pan, and otherwise manipulate the saved string.

To clear the saved string from the screen and resume shooting, select the red X in the upper right corner of the screen when the saved string is displayed.

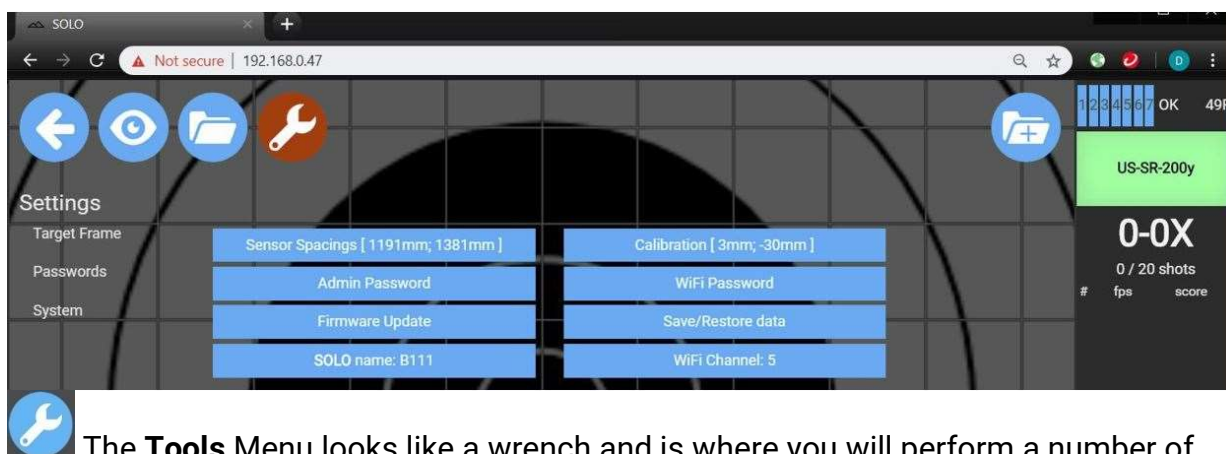


Selecting the small number (representing the number of shots in a saved string) will allow you to download a .csv file with string and shot data. Multiple strings can be selected and downloaded into a single report.



In addition, saved strings can be renamed or deleted by selecting the string and then choosing either the edit icon (pencil) or delete icon (X) on that string.

3.5 Tools Menu



The **Tools** Menu looks like a wrench and is where you will perform a number of maintenance and setup functions such as frame sensor spacing, calibration, optional passwords, update firmware, data maintenance, target name, and WIFI channel.

Sensor Spacing – Enter your width and height of sensor spacing taken in step 2 of the Quick Start guide. Be sure to use the same unit of measure (mm or inches) that you chose in the **Options** menu. To convert inch to mm, multiply by 25.4

Calibration – Allows for calibration of the acoustic center of your target frame to the actual center of your paper target face. With at least one shot on the target, select “Calibration”, click and hold on the target face and drag it to a position so that the bullet holes in the target correspond to the display.

Admin Password – Optional password to access the main menu, protecting critical settings from casual viewers

WiFi Password – Optional password to access your specific unit's WIFI network, that will prevent others from accidentally logging into your network instead of theirs when multiple **SOLO** units are on the same range.

Firmware Update – Only to be performed when instructed to do so by SMT, this feature will update the system firmware.

Save/Restore Data – Saves a backup of the system settings, saved strings, and options.

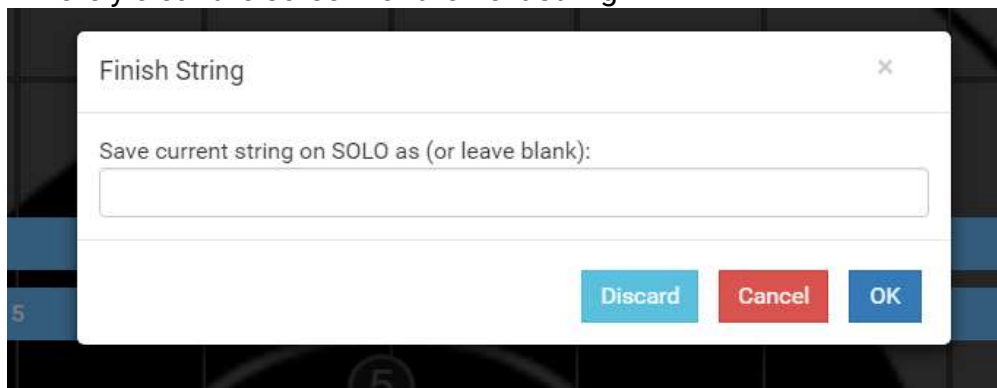
SOLO name:XXXX – Allows you to change the on screen display name of your target from the default serial number.

WiFi Channel:X – Allows you to change the WIFI communications channel

3.6 Save Menu



When a string of fire is completed, select the **Main Menu** (gear icon), then select the **Save** Icon (folder with +) to save it. You have the ability to store hundreds of shot strings and can optionally name each one. You can also save a screen shot of the actual group, but this is a function of your display device, and varies by the type of device you are using. If you don't want to save the string, select the "Discard" button which will merely clear the screen for the next string.



TYPICAL USER FUNCTIONS

4.1 Working With Shots & Shot Strings

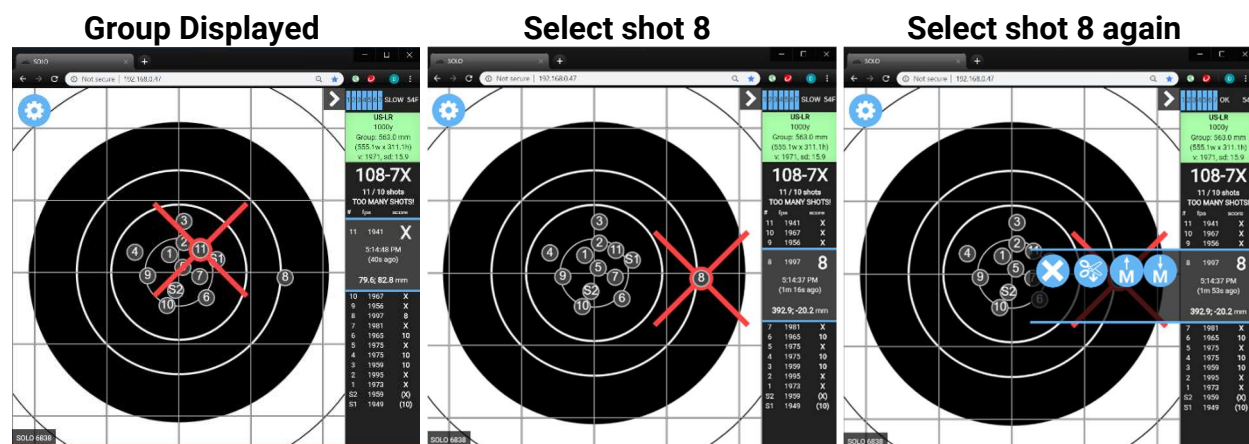
There are a number of user functions that allow a shooter to deal with individual shots already fired, such as Strike a Shot from Record, Convert Sighters, and Insert a Miss.

To perform any of these functions, simply select the desired shot in the Shots Column, then click on that shot a second time and a pop up menu will open. Details on each function are below.

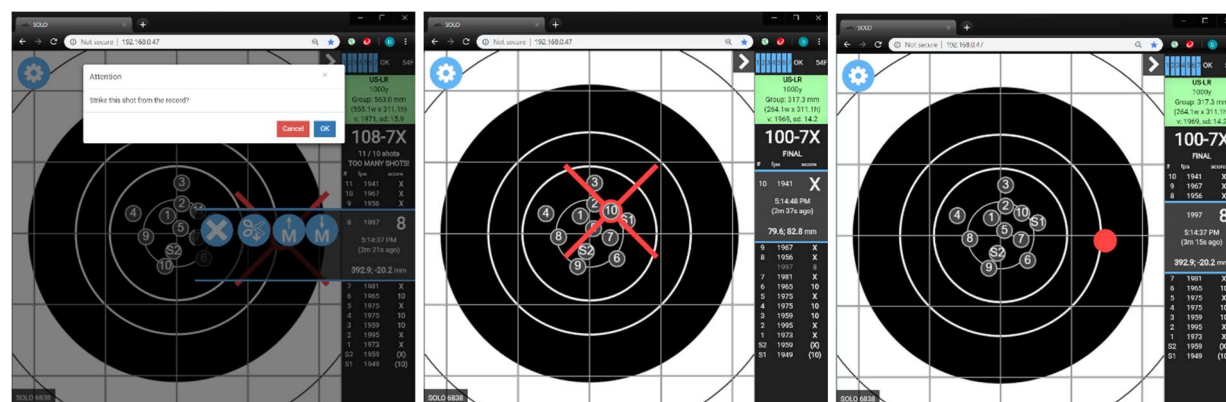
Strike a Shot From Record – This is most commonly used for a cross fire, where a shot arrives on target but is not from this shooter. Another reason might be when group

testing, and a particular shot was known to be “pulled” by the shooter. That shot can be eliminated from the string and group statistics.

In these screen shots, you’ll see a group of 11 shots shown where shot 8 is not from this shooter.



Once the pop-up menu is displayed, simply select the “X” to Strike that shot from record. You’ll be asked to confirm this action by clicking “OK”. That shot will now not be shown on the screen, and its value will be removed from the Shots Column. Selecting that shot in the Shots Column again will show it’s position as a red circle.



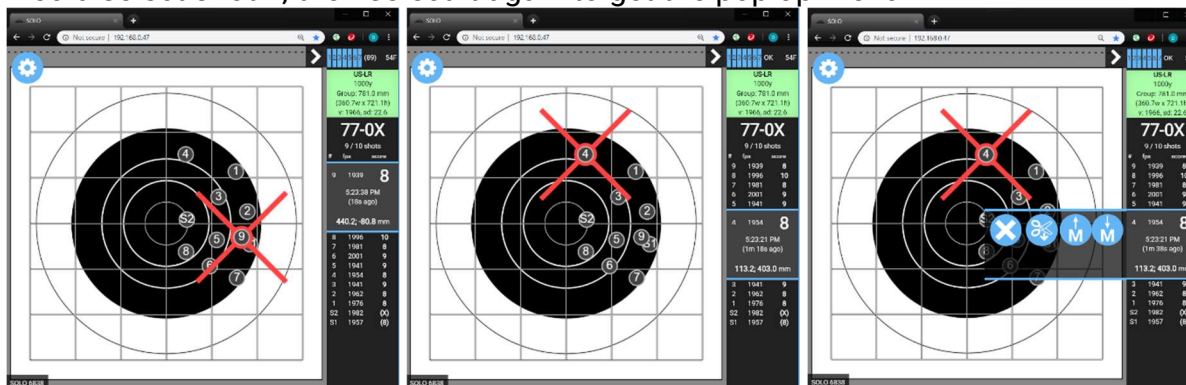
Convert Sighters – This function

Sometimes you may have multiple sighters, and want to go back and convert some of them to record shots at a particular point in the string. Simply select the first sighter that you want to become a record shot, select it again to get the pop-up menu, then select the scissor icon. This will convert this shot, and all subsequent shots to record shots.

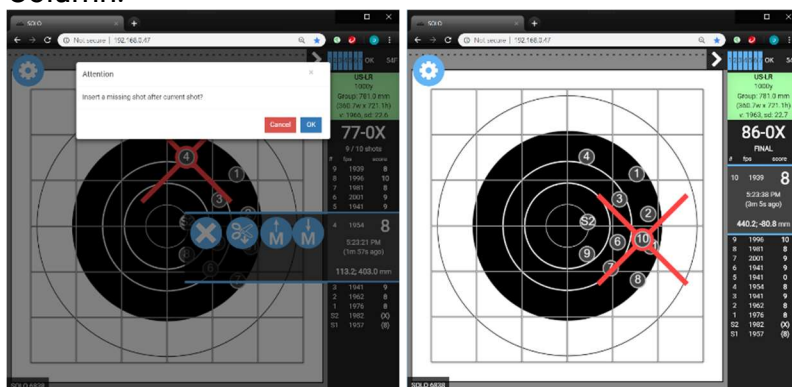
Insert a Miss – This function

In the case of a crossfire, not only would you want to strike the shot from record on the target that received the crossfire, but you may also want to insert a miss into the target where the crossfire came originated. You can insert a miss before or after a particular

shot. In this sequence of screenshots, you'll see a string of 9 shots. It was determined from the scorer/verifier that shot 5 was the crossfire. The scorer or Range Officer would select shot 4, then select it again to get the pop-up menu.



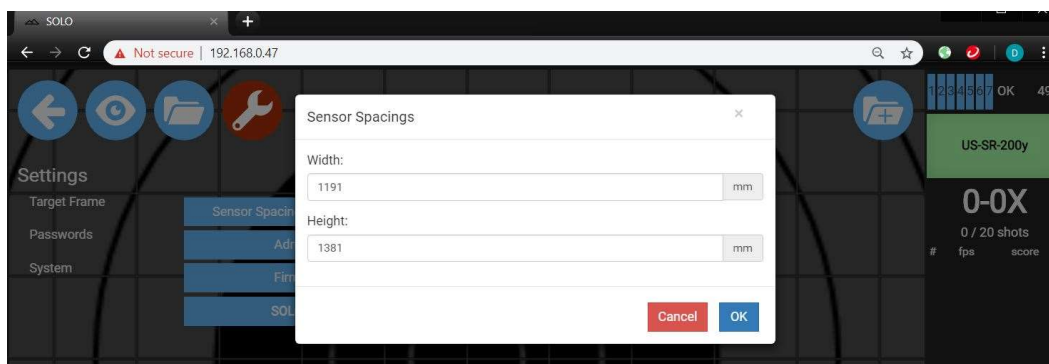
Then select the “M” icon with the up arrow to insert a shot after shot 4. You will be asked to verify this, then a zero value Miss will be inserted in the string in the Shots Column.



4.2 Adding Target Frame Dimensions

A software “TargetFrame” corresponds to a physical target frame with attached sensors and carries the dimension data needed for **SOLO** to gather shot data on that frame. When installing **SOLO** sensors on a frame, you recorded the height and width measurements between sensors. If you ever move your sensors to a different frame, you’ll need to update the height and width measurements in the system for **SOLO** to correctly calculate shot position.

Select the **Main** Menu, then **Tools** Menu   then select “Sensor Spacings”



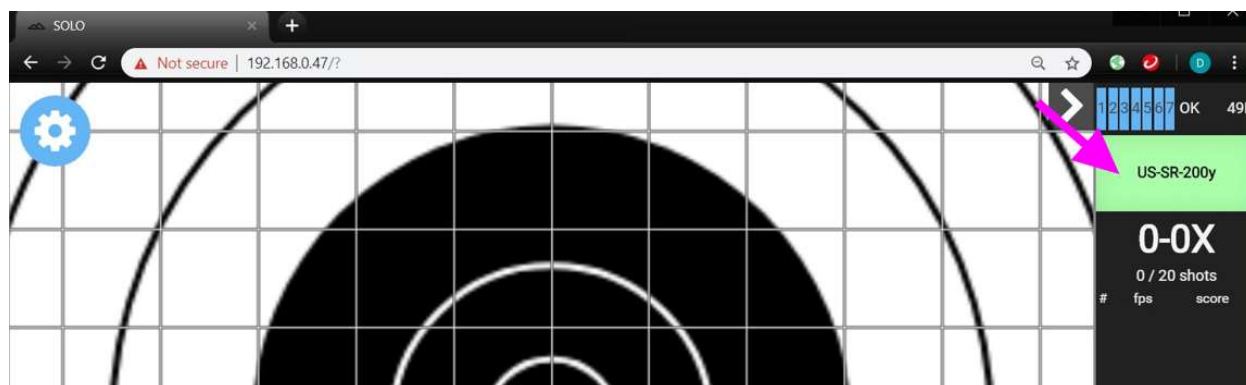
Enter your target sensor width and height. Remember, this data is from left edge to left edge of the upper or lower mics, and top to top of the side mics.

4.3 Sensor, Cabling, and Hardware Validation

Use these procedures prior to calibrating a target, or at any point when diagnostics are needed to confirm that the **F-SOLO** on the Firing Line is communicating with the **T-SOLO** at the Target

To confirm network communication with sensor unit:

- Verify that the selected target is green in the upper right side of the ShotsList Column. In addition, there is a signal strength indicator consisting of 7 bars.
 - If the target is red, and the bars are red and flashing, it means your viewing device is not in contact with the **F-SOLO**.
 - If the target is red, and the bars are empty, it means your viewing device is in contact with **F-SOLO**, but **F-SOLO** is not in contact with **T-SOLO**



To confirm T-SOLO and F-SOLO battery levels:

- The supplied battery packs have charge level indicators on their ends

WiFi Signal Health

Signal Health is displayed next to the signal strength bars. “OK” means things are working well. “Slow” means responses from the target are slower than expected. “Loss” means there were lost packets within the past 2 minutes. At system startup,

you'll see a counter count up to 100 as it runs the initial signal diagnostics. Once the counter gets to 100, "OK" should display.

To confirm sensor unit sensing:

With your fingernail, make **TWO** light, direct, careful taps in quick succession (within ½ second) on the silver sensor can of any microphone.

Observe appearance of a green triangle in one of the four corners of the screen. This green triangle will either say "Front" or "Rear" indicating which mic was tapped.

Repeat this procedure for each other mic in the system.



4.4 Target Calibration

Use these procedures to align the e-target's coordinate system with the physical center of the installed target face. This should only be required on the first installation of sensor mounts, or if the physical target center has moved. It is important to remember to install all subsequent targets with the physical center in the same location. Drawing horizontal and vertical witness lines through the target centers and target backing material for alignment will help.

- Be sure your sensor height and width are entered on the Tools Menu. Install a new target face or paste all holes in the existing face.
- In **SOLO**, select the Main Menu
- Go to firing line and fire one or more shots, with at least one shot being within 10" of the center. Additional shots may be near the center or any other place on the target face.
- CONFIRM that reported bullet speeds agree with expectations
- Go to the physical target and find bullet holes in paper
- From the Tools Menu, select "Calibration", and in the ShotsList column on the right, select one shot.
- CLICK AND HOLD anywhere on the target face display
- DRAG the target face until the on-screen bullet holes match what is seen on the physical target
- Select the blue check mark to accept the new settings or press the red X to cancel.

4.5 Target Faces

Electronic TargetFaces are software-generated. They are available as text files (with a file extension of ".txt" or ".tgt") and binary archive files (file extension ".tgz").

Installing TargetFaces

Most common target faces are preloaded into **SOLO** at the factory. If you desire a target face that is not already loaded, acquire one or more TargetFace definition files from your dealer, or from the SilverMountainTargets.com website

- Select the Main Menu, then the Options Menu, and scroll down to the bottom. Select "Choose File" and choose the target definition file you downloaded.
- Select "Load" to upload those targets

Deleting TargetFaces

Generally, it is NOT RECOMMENDED to delete TargetFaces. If a TargetFace is deleted, all saved strings fired with that TargetFace will also be deleted. If you wish to delete a TargetFace, choose that target face, then select the X on that face to delete it.

4.6 Managing SOLO Data

To download a log of all data or to save a backup copy of all data

- Select the Main Menu, then the Tools Menu
- Select the Save/Restore Data button
- Select Save, or select a previously saved file and select Restore
- Note, this is best done from a laptop with internal storage. If using an iOS operating system device, the saved file may not be able to be retrieved.

4.7 SOLO Firmware Update Procedure

You should ALWAYS make a complete backup of all the **SOLO** data before proceeding. On the Firmware Update menu, there is a "Save/Restore Data" button. Select that button first to save a complete copy of all data. Then select the "Choose File" button to select the new firmware file, and "Update" to load that new firmware file into the system. Wait for the progress bar to show the upload is complete.

When finished, you'll have to reconnect to the SOLO-XXXX network and refresh your browser. You can then restore your backed-up data. Consult your SMT dealer for advice on when to do a firmware upgrade and which version to use.

MAINTENANCE & PRECAUTIONS

5.1 Routine Maintenance Requirements

Unlike chamber targets that require routine maintenance of backer sheets, the Silver Mountain Target requires no routine maintenance, other than keeping batteries charged.

5.2 Weather Resistance

"Waterproof" is an often-used marketing term, conveniently without a precise technical definition. What most people would understand "waterproof" to mean might be described by a recognized technical specification such as "IP67" (protection against immersion to 1m depth). These protection levels are certainly achievable but only

at great expense, neither affordable or justifiable for this generation Target system.

SOLO is designed to achieve IP53 protection level (in shooting terms - driving rain in a strong wind), which is appropriate for most rifle range applications.

5.3 Target Centering

Since **SOLO** was calibrated to know the physical center of the target face, you must make sure all targets are always centered on that same physical center on the frame. It will help if you draw horizontal and vertical lines through the center of the target frame backer, then also draw similar lines on all target faces. This will allow easy alignment of the replacement centers on the frame. Any misalignment will be seen as shots not displaying in the correct location on your display device.

5.4 Frame Stability

It is important that your target frame be stable both in the wind, and with bullet impacts. Any movement during the shot can cause the shot locations to be displayed incorrectly.

5.5 Line of sight

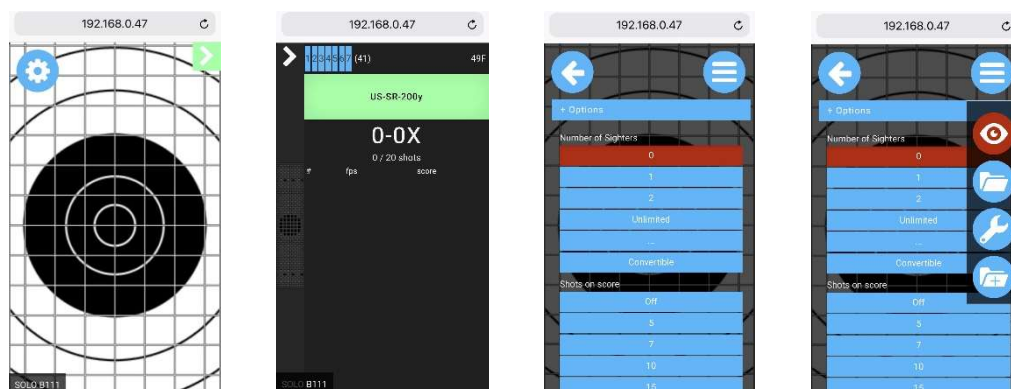
The WIFI antenna on the target must have clear line of sight to the **F-SOLO** on the Firing Line. This becomes more important as target distances increase.

5.6 T-SOLO Protection

The **T-SOLO** unit is one of the more expensive pieces to replace if it gets hit with a bullet strike. Make sure your **T-SOLO** unit is below line of sight or shielded if possible to protect it against impact. A typical installation of an E-Target would have the lower sensor elements and the **T-SOLO** unit below an earthen berm, or behind some protection. This would only expose the upper sensors and WIFI antenna to most impacts, reducing the potential for costly damage.

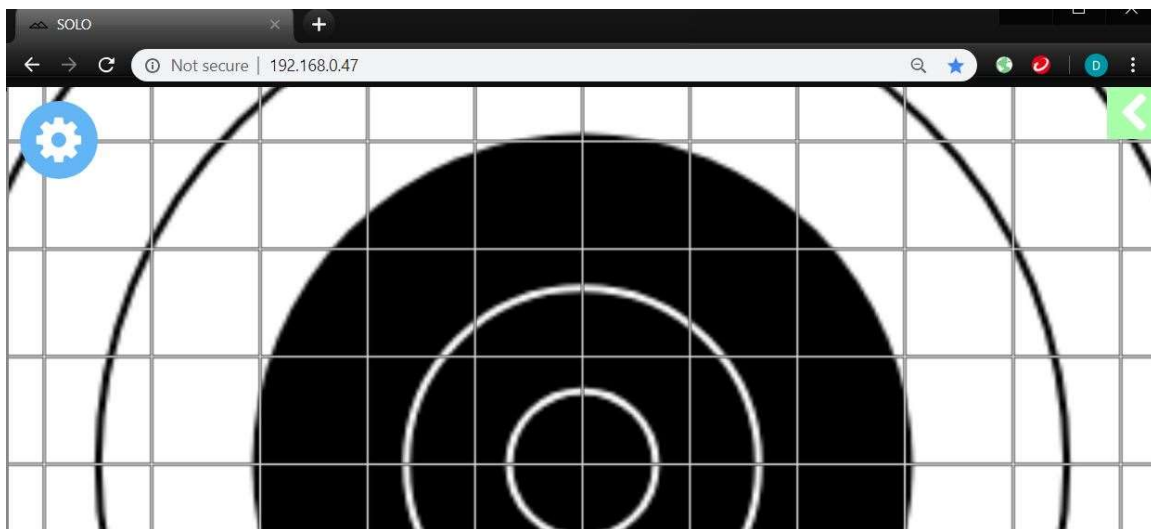
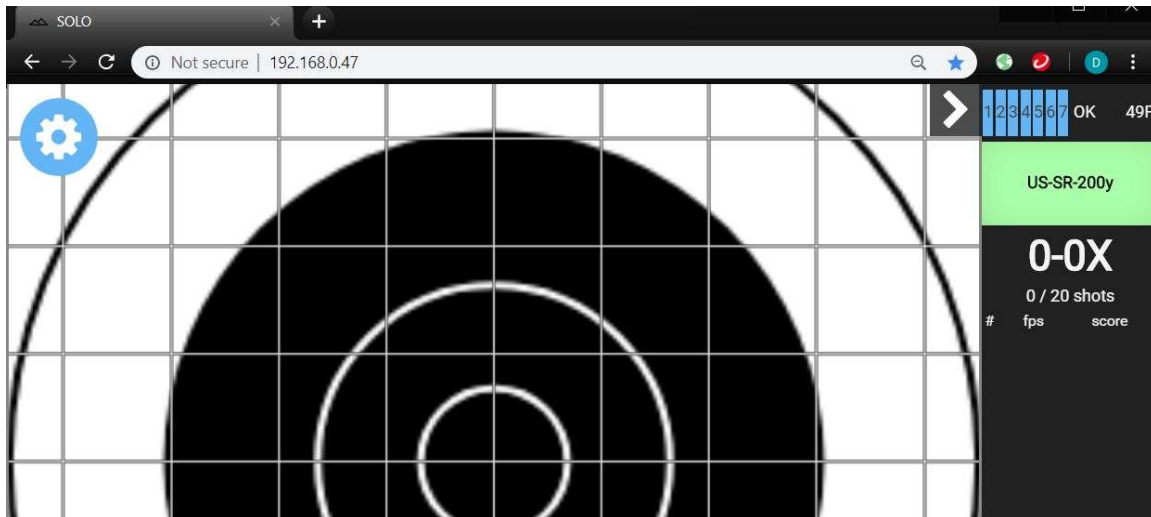
5.7 Display on Small Screen Devices

If you are using a smaller screen device, like a smartphone, the **SOLO** menus and screens will be formatted to fit the smaller screen.

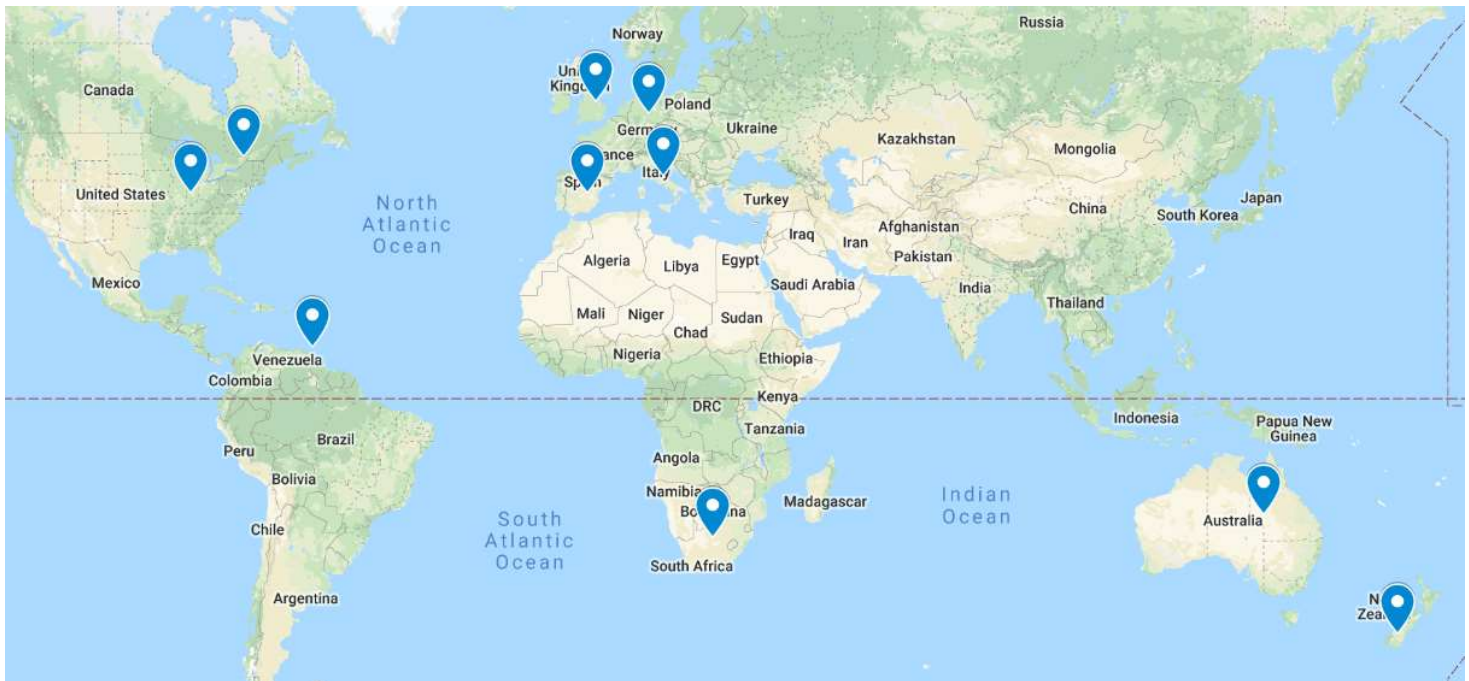


5.8 Collapsible Shots Column

Sometimes screen real estate is such that you want to see more of the target and less of the Shot data contained in the Shots Column. On virtually any display, you have the option of hiding the Shots Column.



Silver Mountain Targets
The world leader in open sensor rifle target systems



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