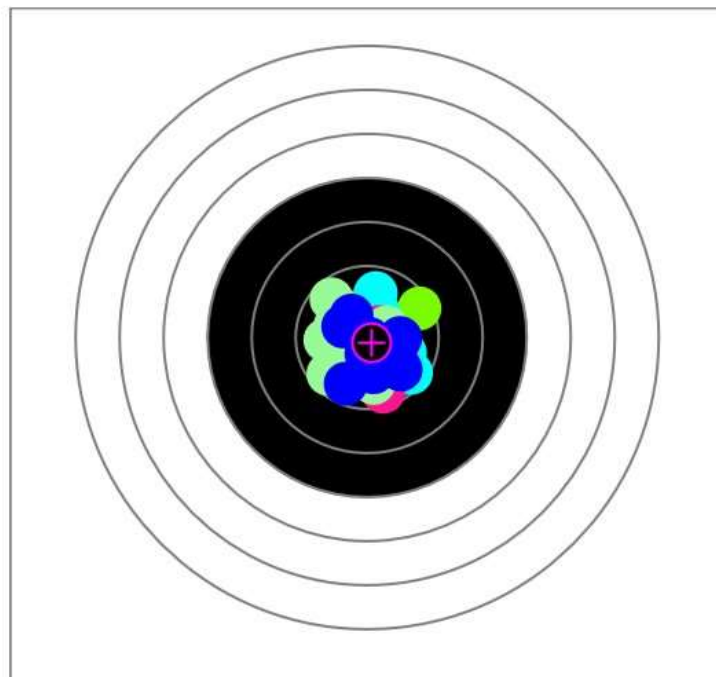# Hold Master Guide

Achieving your target

through continuous improvement

Realtime Results Ltd

24th September 2019

V1.0

Introduction

The Hold Master is a low-cost solution that is ideal for fixed-target rifle and pistol shooters, where the repeated aiming and firing processes can be tracked, stored and analysed.

The solution includes:

- a multi-axis Hold Master motion sensor to capture a shooter's movement
- a Hold Master Collector Phone App (Android or Apple) to record and save the sensor data
- the website, www.HoldMasterX.com to store and present the captured session data and previous sessions
- a Hold Master Collector and Coach Windows 10 Universal App to record and analyse the data on the range.

It captures and manages the motion data of every shot in a training or match session. This provides the shooter and their coach an insight into a variety of issues that may arise during the hold, aim and release processes. Over time, the session history will track the shooters performance and their improvement.

The Hold Master multi-axis accelerometer monitors all movement in three axes, X, Y, and Z, to millisecond resolution. The frequency of data collection is typically every 10 milliseconds and supports dry firing with an electronic trigger.

Hold Master records all movement of the weapon during a shooting session. Sessions can be dry or live firing during practice or competition.

At the end of a session, the shooter may save the data and upload the file to this site for subsequent analysis. Coaches with multiple shooters are also supported.

While the Hold Master multi-axis accelerometer tracks the movement of the firearm, it does not 'view' a target through any optical sensors.

It can only be used to analyse the quality of your hold, timing and rhythm. Consequently, the Hold Master does not give feedback on aiming and is not designed to replace SCATT, Noptel or Rika Shooter Training Systems, as they provide a greater level of analysis than Hold Master.

The Hold Master does support analysis for single or multi-bull targets and both dry and live firing.

The analysis provides the shooter with a range of hold quality results, including:

- Group Size per session;
- Dispersion or distance from the centre for each shot;
- Distance moved in the last 1.0 second and 0.2 seconds;
- Quality of hold for three axes: Horizontal, Vertical, and In-Out;
- Cant and Tilt angles per shot, showing changes during a session;
- Hold time per shot, showing the level of rhythm during a session;
- A Quality Rating for each shot based on the Key Performance Indicators;
- An overall session rating based on the Key Performance Indicators;
- Comparison table of all sessions to measure change and improvement.
- High resolution trends of each degree of movement that can be used to identify patterns e.g. pulse, breathing, etc.

This Document

This document covers the introduction of the Hold Master, its sensor and together with the Hold Master Collector App and the first steps necessary to start collecting session data.

The Hold Master Website, www.HoldMasterX.com, is used to analyse the shooting sessions. This site is described in a separate document.

First Steps

There are three core steps required before you can use the Hold Master. These are:

- Register as a Shooter on the website, www.HoldMasterX.com
- Install the Hold Master Collector App
- Connect the Sensor to your rifle or pistol

Register as a Shooter on the website.

The first step is to register on the website, via the registration form.

The Login name may be a nickname or a combination of first and last names, e.g. First name plus first letter of last name.

This login name must be used as the Shooter's name when completing the App details. Also, the coach's name must match the coach's login name.
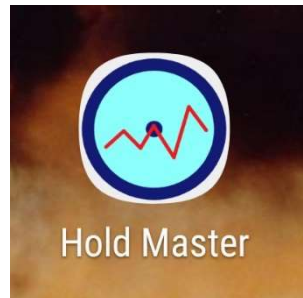

Figure 1 Registration Page

Once a shooter is registered, they may order a Hold Master, download an Android App and upload shooting sessions to this site.

Install the Hold Master Collector App

The Collector App is available from either the Apple Store for iPhone users or from the Google Play Store for Android users.

Look for the new app icon and add it to one of your pages.

Connecting the Sensor to your Rifle or Pistol

The sensor must be attached to the firearm in a specific orientation.
The sensor has arrows which indicates the orientation to the target and the up direction. If the sensor is not placed in the correct orientation, then the data seen on the website will be wrong.
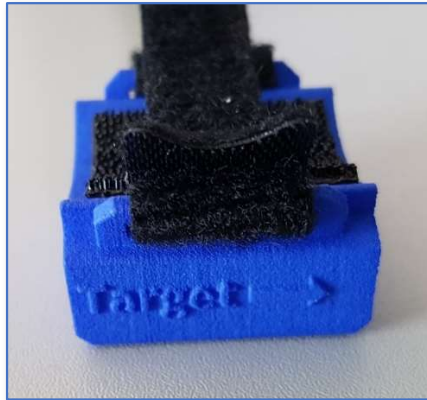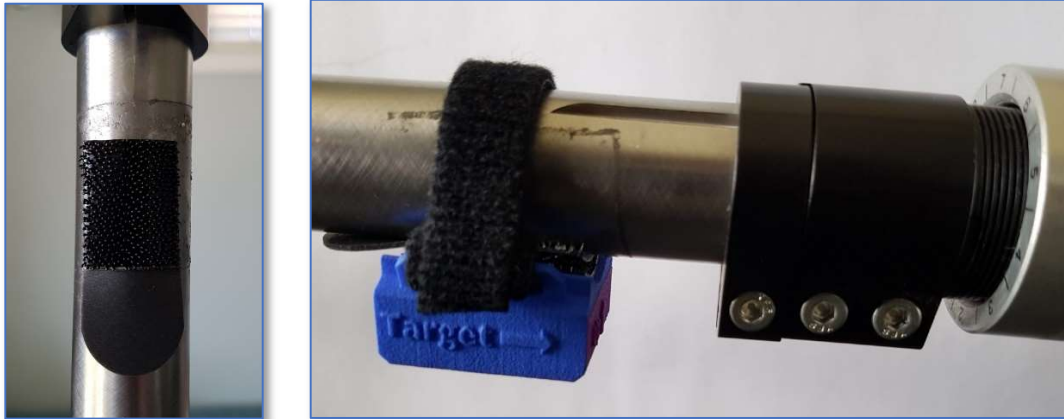

Figure 2 To Target Arrow

Figure 3 Up direction on Sensor

The ideal place for the sensor is directly under the barrel, nearest to the muzzle. In the case of a pistol, the sensor needs to be a little further back from the muzzle so when the pistol is rested on the bench, it is not resting on the sensor.

Figure 4 Pistol with sensor under barrel

If your sensor has a Velcro strip provided, attach the other piece of Velcro tab to the underside of the barrel so the sensor will be directly under the barrel.

Click the sensor into the Velcro tab on the barrel and then use the Velcro straps to ensure the sensor is firmly attached to the barrel.

If you leave the sensor in place between sessions, just check that it's secure prior to use.

The sensor is powered by a coin style battery. The app will check the battery charge level on connection. If the battery is too low, open the sensor case (see Open arrow on case) and replace the battery with a new CR2032.

In the picture of the pistol, the purple sensor shown is an auxiliary or secondary sensor that would usually be attached with a Velcro strip, in this case on the pistol butt.

Sensor Battery

The sensor is powered by coin battery. The battery level is checked by the Collector App and an indication will be provided if the battery level is too low. If the sensor is not found, the battery may be flat.

The required battery is a CR2032 and is normally available is most Supermarkets.

Figure 5 Sensor battery

The sensor is inside the case. Look at the side of the case to determine which way to slide the top off the base unit. It is often easier to carefully push the battery out of its slot with a small screwdriver.

Figure 6 Opening direction on case

It is good practice to keep a spare battery in your shooting bag.

Hold Master Collector App

The images below are taken from the Android App. The Apple iOS App is slightly different in appearance but provides the same essential functionality.

The first page that you will see when you first start the App is the Introduction page. The Intro page describes the Hold Master App and allows you to select your sensor. Ensure that your sensor is nearby. Once you have selected your sensor, this page will not be shown again.
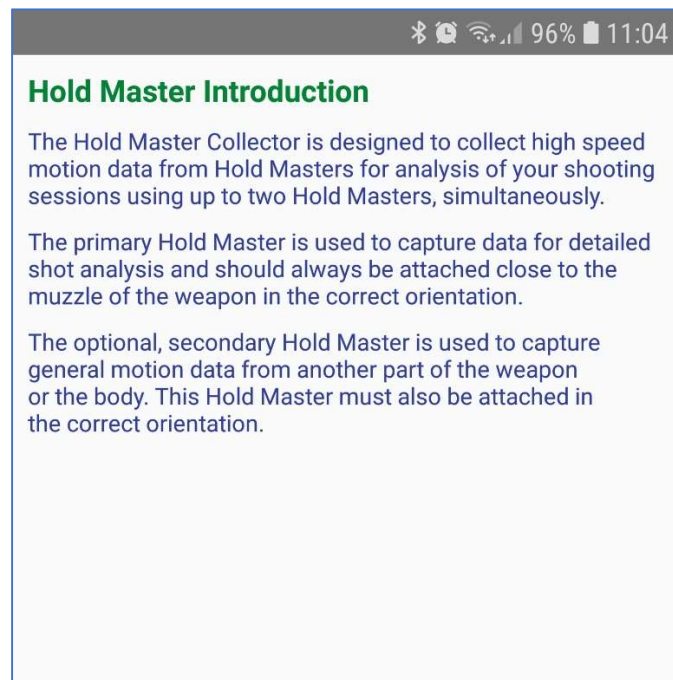

Figure 7 Intro Page

There are three steps involved in capturing your shooting session data with the Collector App, via the Sessions Home page.
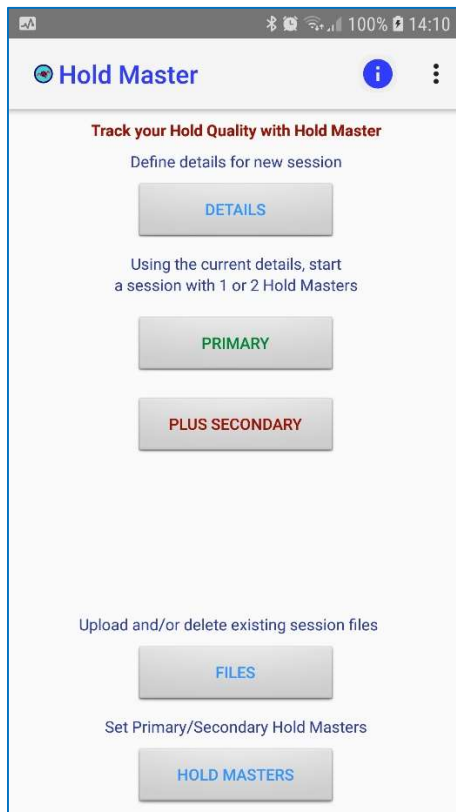

Figure 8 Sessions Home Page

The first step is to register your sensor with the App. This is normally done from the Intro page. Usually this is only required once, unless you change or add a second sensor. The second sensor can be used as an auxiliary sensor for additional data or for a second shooter.

The second step is to define your session details. Some of these details will change for each session so it is good practice to check and update the details prior to shooting.

When the sensor has been registered and the session details completed, then the third step is to select the appropriate session, either with a single sensor or dual sensors or for two shooters.

The first two steps can be done before going to the range or setting up for a dry firing session.

Sensor Registration

Click the Set/Register Sensor button to bring up the Sensor Registration page.

The page shows the current status of the primary sensor and the second sensor. If the primary sensor is "None", then you will need to select a sensor and set it as the primary sensor.

If the second sensor is "None", it can be left as is, unless you also have a second sensor for auxiliary data or want to collect data for a second shooter.
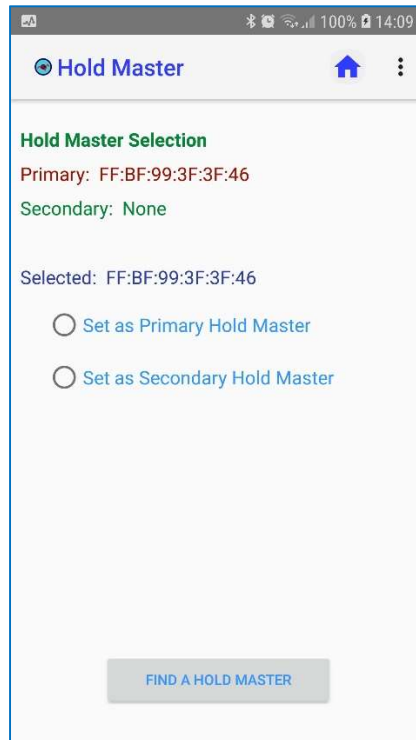

Figure 9 Sensor Registration Page

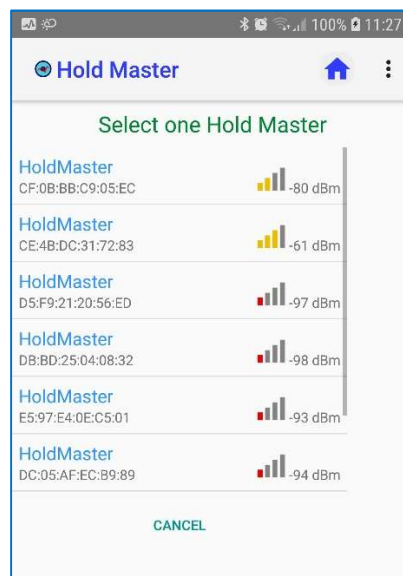If the primary sensor is "None", click on the Select a Sensor button.

Figure 10 Select Sensor Page

Hold your sensor near the phone and the strength indicator should be green or yellow. Click on (touch) the sensor and it will connect to the sensor and return to the Sensor Registration page.

On the Registration page, select the Set as Primary Sensor option and then return to the Home page.

Session Details

The details of each session need to be entered prior to the session. This information is included in your session data file and is used by the website to identify each session that has been shot.

From the Home page, click on the Session Details button which will bring up the Session Details page. This information becomes the default details for subsequent sessions. If you wish to collect session data for a different shooter, enter the new shooter's details. These then become the defaults until the are changed again.

The shooters name must match the shooter's login name used to register on the website.

If you have a coach, the coach's name must also match the coach's login name. When a coach logs into the website, they will be able to then view your sessions.

The Session field is for a brief description of the session to help you identify it later.

Use the dropdown boxes to help define your session. Discipline, position and firing mode are used in the website to help filter the sessions.

Once the details have been completed, return to the Home page to then select the required session. These details will be retained and typically the only the session description, mode and session type need to be changed from session to session.

Figure 11 Session Details page

Capturing Session data

The sensor and the phone communicate with each other using Low Energy Bluetooth (BLE or v4.0). Consequently, phone must be within 10 metres of the sensor.

From the Sessions Home page, for a single sensor session, click on the One Sensor button for the data capture page.
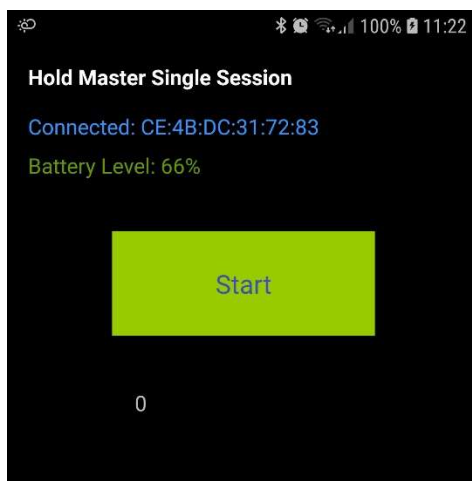

Figure 12 Start Sensor Recording

This page will show the connection and battery status. If all is well, then the Start Recording button will appear.

Click on the Start button to begin data capture from the sensor. The Stop button will appear and must be pressed to end the data collection.
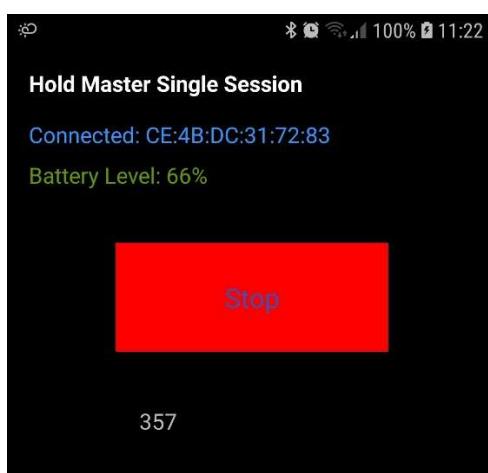

Figure 13 Stop Sensor Recording

When you stop recording, you will be returned to the Home page where you can define a new session, if required.

Once the sessions are completed, you will need to upload the session files for later analysis.

Connection Issues

If the phone cannot connect with the sensor, first try clicking on the Retry button or go back to the Home page and repeat clicking on the Primary button.

If that is still a problem connecting, go back to the Home page, select Hold Masters, then select Find a Hold Master and check that your Hold Master sensor is the correct sensor and it is in range.

Select the Host Master and set it as your primary or secondary unit.

Managing Session Files

Uploading Session Files

A data file is created for each session and includes the session details defined earlier. As the size of the file is large, it can only be uploaded via Wi-Fi. As many ranges do not have Wi-Fi, the upload process should be done when you have a good connection, so the App can upload your session file to our Azure database in the cloud.

From the Sessions Home page, click on the Session Files button for the Session Files page.
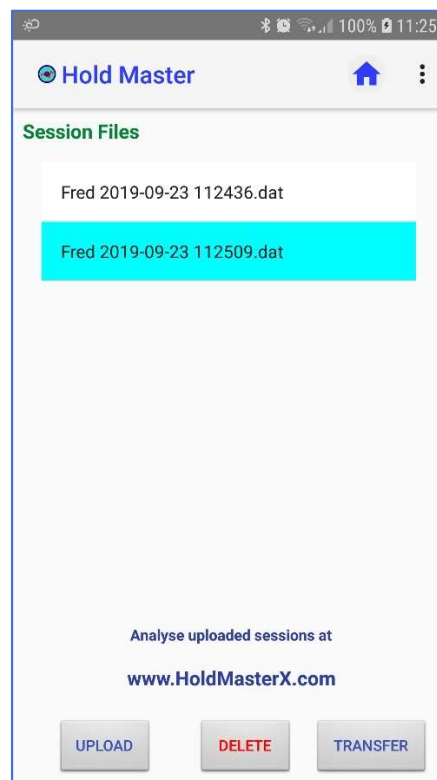

Figure 14 Session Files Page

The Files page will list all the session files on your device. Click on the session file to select it, then click on the Upload button. The Upload button is only visible if there is a suitable network connection available. As the file will be several megabytes in size, the upload time is likely to take between 30 - 60 seconds to complete. A notification will pop up when the transfer has been complete. If the Android version is 7.0 or greater, there will also be a notification sound.

Deleting Session Files

To delete a file, select the file and then click the Delete button. You will be prompted to confirm the deletion of the session file.
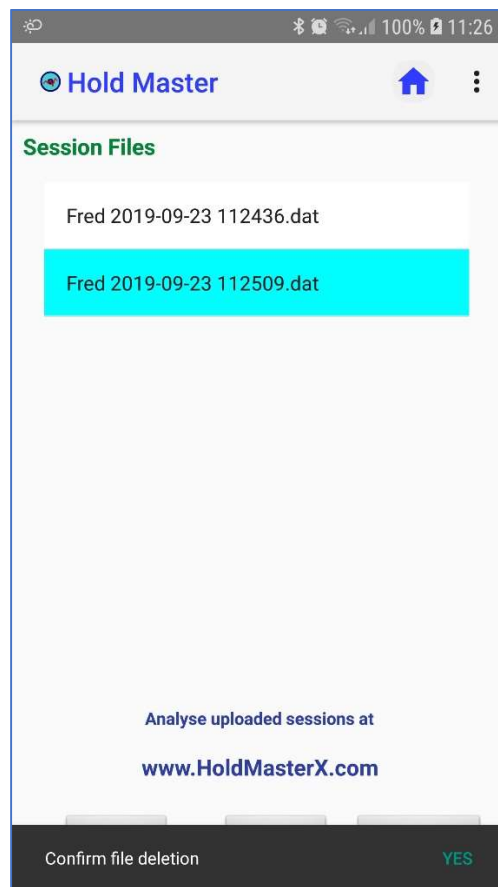

Figure 15 File Deletion Prompt

It is good practice to check that the file was uploaded to the website first, before deleting the file.

As these files are quite large, the files should be deleted once they are in the website to avoid disk space problems on your phone.