



IR video goggle solution

User Manual

Vesticam Monocular IR video goggles, with fixation light (V2C22021)

Vesticam Binocular IR video goggles, with fixation lights (V2C2C22021)



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1.Introduction

This user manual is valid for Vesticam2 IR video goggles, monocular (V2C22021) and binocular (V2C2C22021)

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1.1 Intended Use

Vesticam IR video goggles are intended for use by qualified health care professionals/ medical specialists/ trained clinicians working with patients who have various degrees of dizziness or vertigo (vestibular conditions), and for research and education purposes. The standard and accepted assessment of vestibular conditions involves general history taking, a thorough and detailed vestibular specific subjective assessment, testing for differential diagnoses, and the clinician's choice of over 15 standard and clinically proven bedside tests. Some of these tests are performed in complete darkness or require patient head movement, making the rapid and often fleeting eye movements even more difficult to observe clearly.

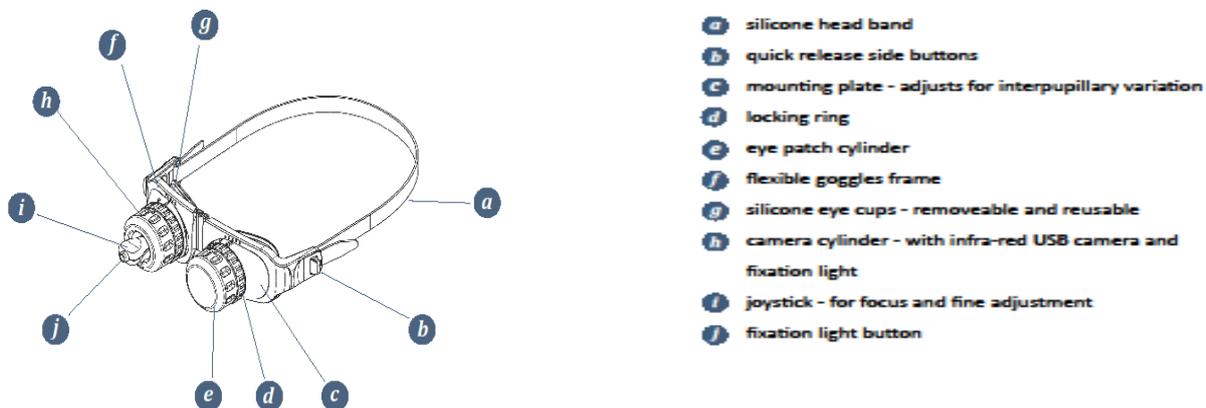
Vesticam IR video goggles are an active medical device intended by the manufacturer to be used for the specific purpose of improving observation of eye movement during some of the currently accepted and used 15 clinical bedside tests. The user/clinician remains entirely responsible for their choice of specific bedside tests, any clinical interpretation of the eye movement, and any further subjective or objective assessment. The intended outcome of providing eye movement recordings is that the user/ clinician can more confidently support their own clinical judgement with regard to the need for more detailed assessment.

Vesticam IR video goggles are not intended by their manufacturer to replace the clinical judgement of a health professional in relation to making a clinical diagnosis or decision about the treatment of patients. Vesticam IR video goggles do not have a measuring function and are not intended by the manufacturer to measure quantitatively a physiological or anatomical parameter.

Vesticam IR video goggles are powered by connection to the clinician's recording device: android phone, tablet or computer. Any of these devices can allow viewing and recording using the clinician's or organization's own software. Clinicians must follow their own, or their organization's normal Electronic Medical Record pathways in the recording, storage and transfer of eye movement videos taken using Vesticam IR video goggles.

1.2 Product Description

(a) System Configuration



Vesticam IR video goggles are available as monocular with fixation light and can be upgraded to binocular with 2X fixation light cameras.

A separate viewing and recording device is required for use.

(b) Minimum IT Requirements for Monocular Viewing and Recording

Vesticam2 Monocular can be used with a smartphone, tablet or a PC/laptop/Mac.

Phones and ipads are not currently able to work directly with Vesticam IR video goggles.

The Vesticam App is not required for viewing or recording eye movement. Any software for viewing videos via a USB camera will function with Vesticam2 IR video goggles. It is not the responsibility or intention of the manufacturer to recommend or approve software for viewing eye movement.

The Vesticam App is designed to make viewing using an android phone or tablet easier for clinicians, and is supported and made freely available by Vesticam Pty Ltd.

OBS software is supported and customised by Vesticam Pty Ltd to make viewing using a PC/laptop/Mac easier for clinicians.

1. Supplied Android Recorder (Android smartphone, no SIM card)

Android Recorders supplied by Vesticam have proven durability, rapid charging capacity, and an optional easy fingerprint reader option to unlock. A supplied Android Recorder also comes with the Vesticam App pre-installed, and has been tested for speed, quality screen image, and good quality sound for audio recording. A SIM card is not included and is not required for use with Vesticam2 IR video goggles.

Or clinicians may choose to view and record from Vesticam2 IR Goggles using their own device.

2. Own Android Phone or Tablet

System requirements:

Android Recorder (Phone/Tablet) *	
Application	Monocular / Single camera
Software	Vesticam App v5.0
Operating System	Android 10+ with OTG **
Processor	Octa-core 2.0 GHz or faster
RAM	3GB +
USB Ports	USB Type-C or USB Micro B
Storage	32GB + (1000 x mp4 video recordings of 2min each)
Microphone	Built in
Speaker	Built in
External Room Camera	N/A
Internet Connectivity	Not required

* Compatibility includes a video recording with frames per second ≥ 26 . Please contact support@vesticam.com for more information.

3. PC/Laptop/Mac (see 2.2.3)

An extension lead with adaptors (for use as needed) is included in each Vesticam case. This allows clinicians to connect directly to PC/Laptop/Mac.

Vesticam recommends use of the freely available and encrypted OBS software for eye movement viewing and recording on a computer. Clinicians not requiring the features of OBS Studio may prefer to use standard video recording software such as “Camera” (Windows) or “Photobooth” (Mac) included on their PC/Laptop/Mac for monocular viewing and recording.

OBS Studio is a feature-rich software package that enables clinicians to preview & record patient eye movement and save the recording as an mp4 video file.

Why OBS Studio software?

- allows multiple camera sources eg. Eye camera and a room camera
- allows custom text to be embedded on the mp4 video eg. patient, test, date & clinician
- allows for pause during recording
- assigning of hot keys to simplify and speed up use
- the software is free, works on Windows PC or Mac and is used widely
- Vesticam provide setup services and ongoing support

Vesticam will send a separate reference document showing how to customize OBS on a computer. Vesticam Support will use email, phone or screen sharing to ensure the setup is complete, and the equipment works to its specifications. Initial set up support takes 30-45 minutes and is provided at no additional cost to users.

OBS is freeware provided under a General Public Licence. More information about freeware General Public Licence can be found here <https://www.gnu.org/licenses/old-licenses/gpl-2.0.html>

Vesticam provides the necessary support and guidance for configuring their software so that it is relevant for monocular and binocular vestibular testing. The OBS source code is unchanged. OBS is provided at no cost and is freely available. Users may be invoiced for assistance provided in the physical act of transferring a copy of OBS with suggested modifications.

Please check with your organization’s IT department that OBS meets its security requirements.

System requirements:

PC / Laptop / MacBook, Mac Pro	
Application	Monocular / Single camera
Software	OBS Studio (free download) https://www.gnu.org/licenses/old-licenses/gpl-2.0.html Simple alternatives: Windows “Camera” or Mac “Photobooth”
Operating System	Windows 10+, macOS Sierra 10.12+
Processor	Core i5, i7, equivalent or higher
RAM	4GB+
USB Ports	USB Type-C or USB-A Use bluetooth compatible mouse to free up a USB port if needed.
Storage	32GB + (1000 x mp4 video recordings of 2min each)
Microphone	Built in
Speaker	Built in
External Room Camera	A room camera is optional. The room camera can be added by using the laptop’s built-in camera or using an external USB camera & tripod.
Internet Connectivity	Not required

(c) Minimum Requirements for Binocular Viewing and Recording

Vesticam2 Binocular requires a PC/laptop/Mac.

Hardware requirements for using binocular IR video goggles:

- Two camera units (with fixation light)
- Dual Micro-B extension 2.0m lead
- Adapters connection to PC/Laptop/Mac

The Binocular package can be purchased outright as a monocular unit including 2X camera units, dual cables adaptors etc., or by upgrading an existing Vesticam Monocular solution and adding an extra camera unit and dual extension leads.

A Room Camera is optional. The room camera can be added by using your laptops built in camera or by purchasing an External USB Camera & Tripod from Vesticam.

Binocular Software Recommendations:

OBS Studio is a feature-rich software package that enables clinicians to preview & record patient eye movement and save the recording as an mp4 video file.

Why OBS Studio software?

- allows multiple camera sources eg. two eye cameras (binocular) and a room camera
- allows custom text to be embedded on the mp4 video eg. patient, test, date & clinician
- allows for pause during recording
- assigning of hot keys to simplify and speed up use
- the software is free, works on Windows PC or Mac and is used widely
- Vesticam provide setup services and ongoing support

Vesticam will send a separate reference document showing how to customize OBS on a computer. Vesticam Support will use email, phone or screen sharing to ensure the setup is complete, and the equipment works to its specifications. Initial set up support takes 30-45 minutes and is provided at no additional cost to users.

OBS is freeware provided under a General Public Licence. More information about freeware General Public

Licence can be found here <https://www.gnu.org/licenses/old-licenses/gpl-2.0.html>

Vesticam provides the necessary support and guidance for configuring their software so that it is relevant for monocular and binocular vestibular testing. The OBS source code is unchanged. OBS is provided at no cost and is freely available. Users may be invoiced for assistance provided in the physical act of transferring a copy of OBS with suggested modifications.

Please check with your organization's IT department that OBS meets its security requirements.

System requirements:

PC / Laptop / MacBook, Mac Pro	
Application	Binocular / Dual Camera
Software	OBS Studio (free download) https://www.gnu.org/licenses/old-licenses/gpl-2.0.html Simple alternatives: Windows "Camera" or Mac "Photobooth"
Operating System	Windows 10+, macOS Sierra 10.12+
Processor	Core i5, i7, equivalent or higher
RAM	4GB+
USB Ports	USB Type-C or USB-A Binocular recording requires two dedicated USB-A and/or USB Type C ports (USB 2.0 or USB 3.0). Use bluetooth compatible mouse to free up a USB port if needed.

Storage	32GB + (1000 x mp4 video recordings of 2min each)
Microphone	Built in
Speaker	Built in
External Room Camera	A room camera is optional. The room camera can be added by using the laptop's built in camera or using an external USB camera & tripod.
Internet Connectivity	Not required

(d) Included and Optional Parts

Vesticam2 IR video goggles are supplied with:

1. **Goggles flexible face plate and mounting plate:** comfortable, hypo-allergic face frame and quick release buttons.
2. **Camera cylinder with internal fixation light.** Light tight and reversible for use on either eye. Easily adjusted in all planes while in situ to suit most inter-pupillary distances and corneal depths. The camera comes with a light weight, resilient 90mm cable, which can be extended to 2.9 m with supplied extension lead.
3. **Eye cover cylinder.** Can be slipped into place without removing goggles to provide light tight seal for tests requiring fixation removed.
4. **USB adaptors**
5. **2m extension lead (USB C to C)**
6. **Compact Portable Case**

Optional extras:

7. camera unit and dual extension lead (to allow for binocular viewing)
8. extra silicone eye cups
9. android recording device (smart phone), with pre-installed Vesticam App, and lanyard.

Please note, if you have purchased an android recording device from Vesticam :

- Use the cable and charger supplied to fully charge your supplied phone before use.
- **There is no SIM card supplied with this phone, nor is it required.**
- **You can operate the Vesticam Unit without connecting to WiFi**
- **To set up a security PIN (if you wish), go to settings/security and location/ screen lock PIN and add your own PIN.**
- **The Vesticam app is pre-installed and ready to use. It can be uninstalled by the user at any time.**

Vesticam Pty Ltd does not take any responsibility for the functioning of the android recorder / phone including the Vesticam app if the user installs any other software or uses the android recorder for other purposes

For pricing and replacement parts please access www.vesticam.com or email info@vesticam.com

1.3 Warnings and Precautions

Interpretation of eye movement videos recorded on Vesticam2 IR video goggles will be affected in patients with very poor vision or abnormal/defective blink. Please consult a specialist in these circumstances.

Use of Vesticam2 IR video goggles may be contraindicated in patients with recent facial trauma, broken skin, eye surgery, or blindness, and in patients who are infectious.

Persons proposing to use Vesticam2 IR video goggles for a medical purpose must rely on their own medical, clinical and legal judgment, and such persons shall be solely responsible for the suitability of Vesticam2 IR video goggles in any situation and for any medically related diagnosis or applications.

The purchasing party and/or practicing clinician agrees to indemnify, defend, and hold harmless Vesticam2 Pty Ltd from and against any loss, cost, or damage of any kind, including loss or damage which may arise from non-performance or defective performance; damage to real or personal property of purchasing parties or third parties; injuries suffered by employees, subcontractors or the general public.

Do not use if the Vesticam2 IR goggle unit is showing any signs of damage. If you are unsure, please contact Vesticam support (support@vesticam.com). See also section 3.1 Care and Maintenance.

2. Vesticam2 Monocular IR Video Goggles

2.1 Clinical

2.1.1 Setting Up and Using Vesticam2 Monocular IR Video Goggles and Android Recorder or Tablet

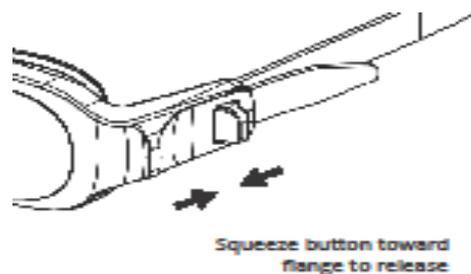
Vesticam IR video goggles are easy to set up and use.

SETTING UP VESTICAM IR GOGGLES ON YOUR PATIENT

1. Start with the camera cylinder and eye patch cylinder off...not attached to the goggles
2. Follow your normal patient hygiene pathways when applying the goggles. Use effective alcohol/anti-microbial wipes to clean goggles face plate, silicone eye cups and head band before and after each patient. Do not use on patients with infective disorders. (see also 3.1.2 "Cleaning and avoiding contamination" and Appendix 1 full instruction manual)

3.

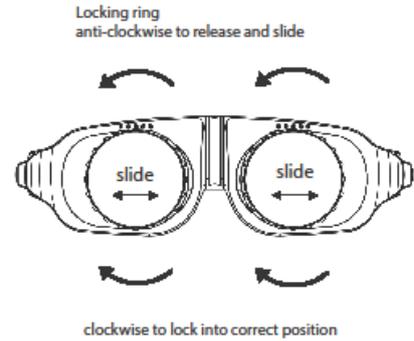
The goggles are comfortable, high quality and flexible enough to fit most face shapes and sizes. Loosen the head strap by squeezing the quick release buttons and the goggles flange together



4. Help your patient to position the goggles for comfort. Most patients can do this themselves, like swimming goggles.

5.

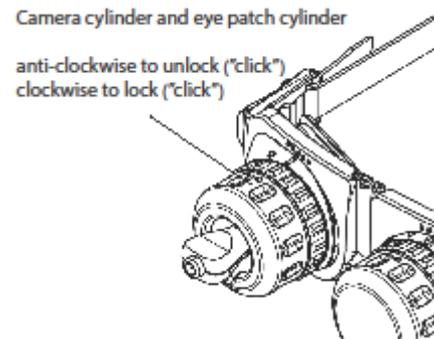
To adjust for interpupillary distance, loosen the locking rings at the front of the mounting plate by turning anti-clockwise. Allow the mounting plates to slide into a comfortable position on your patient's face. Your patient should be able to see out of both viewing holes.



6. Pull rubber tags at each side of goggles to tighten gently, and then lock the mounting plates into place by firmly tightening the locking rings in a clockwise direction.
7. Hold the camera cylinder so that the lead is exiting the cylinder at "5 o'clock". Insert the camera cylinder into the mounting plate, and rotate it clockwise until the camera cylinder "clicks" and locks into place (lead should be at "6 o'clock" when locked).

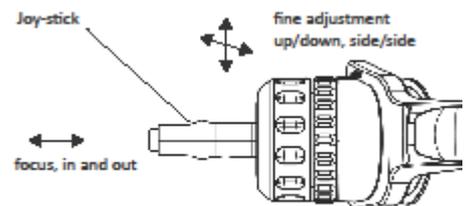
8.

If you cannot see your patient's eye completely on the viewing screen, simply loosen the locking ring, realign the camera, and retighten the locking ring.



9.

TO FOCUS and fine tune eye position use one hand to stabilize the camera cylinder and the other hand to move the camera joystick up / down and side / side until the eye image is central on screen. Firmly pull camera joystick in / out to focus the image of the iris and edge of the pupil. The camera cannot be pushed into the eye as there is an end stop. It is important to focus the eye to ensure that possible torsion is visible



10. To deny vision, slip the eye patch cylinder (e) into the remaining mounting plate. Twist the cylinder clockwise and "click" to lock into place.

TO ALLOW FIXATION:

11. Press the small button (10) at the end of the joystick to activate the fixation light. When the button is IN, the fixation light is ON. When the button is OUT, the fixation light is OFF.

NOTE: the fixation light will only work when the camera is plugged in to the external recording device (phone, tablet or computer).

Vesticam2 goggles are designed to be light tight. Adjust the goggles with your patient so they are comfortable, secure, light tight, and firm.

If you have further questions or concerns please check www.vesticam.com/support or email support@vesticam.com

TO CONNECT TO THE RECORDING DEVICE:

1. Switch recorder ON (press and hold on/off button at right side of recorder/phone), swipe up to go to home screen.
2. Open Vesticam App (touch screen)



3. Open “view from camera”
4. If you want extra cable length, connect the camera cable to the extension lead now.
5. Connect the lead with camera attached to the phone via the USB socket.
6. “Allow the app Vesticam to access the USB device”..... Press “OK” Your screen should now show the Vesticam camera image.

NOTE: To increase battery life, we recommend that you DISCONNECT YOUR CAMERA BETWEEN PATIENTS. You will also need to disconnect your camera when you recharge your android recorder.

2.1.2 Recording using the Vesticam App for Android Recorders (Monocular Use Only)

PRE-NAMING RECORDINGS

Files can be renamed at any stage. To pre-name the eye movement video BEFORE recording press the pencil icon and tap on information box. The keyboard will appear. Press “next” then “done” then “save”.

RECORDING WITH THE VESTICAM APP

Once the view from camera is visible and the patient’s eye is well positioned and in focus:

1. **Press the red circle to RECORD.** It will become a **red square**, and app will read “**started the video recording**”. The phones microphone records audio so that you can speak and record an audio of your session as you simultaneously record eye movement. Ensure the audio is set to maximum. Audio can be muted and unmuted at any time throughout the recording if needed.
2. If this is the first time you are connecting the camera, permission may be requested. Press “OK”, and “Allow” Vesticam to directly access the microphone to record audio.
3. **Press the red square to STOP**
You will be prompted to save or delete the recorded video. Note: for added efficiency the last file label saved always auto-fills the boxes.
4. **Choosing to “SAVE”**
Touch each box to label your patient video file with: patient ID, Test information (eg: HST, DHT etc), and Clinician info (this could be location or name).
Clinicians can label files at any time, including before recording, by pressing the “pencil” / EDIT icon.
5. **If you choose to “DELETE”, you will be asked to confirm.**
You can switch the internal fixation light on or off at any time throughout recording, and record on the audio that you have done this.
You can also use the pre-installed metronome during recording if required.

REVIEWING VIDEOS

1. **To review Video** press “mountains” image at top right of screen which takes you to the image library, or use the arrow at top left to go back to home page, then press image library. Videos are stored automatically, with the most recent at the top. The date and time are the file name.
2. **The SEARCH button allows clinicians to search by patient ID, test info, clinician or date.**
3. **Press on the file to open.**
4. Press “PLAY” (arrow) to review the video.
5. **Options on left of screen (top to bottom): Back to home page; Slow mode (½ speed viewing); rename video.**
6. **Options on right of screen: “Share” (top icon) and “delete” (bin icon)**
7. You can view any part of the video by manually dragging the progress bar.

2.1.3 Vesticam App - Tips for Working with Video Recordings

Speaking while recording can assist you with identifying your patient’s subjective responses to different tests, recording verbal consent if required, and naming vestibular tests.

Consider:

- starting recordings with: “(patient’s name), are you happy for me to record this test” for verbal consent
- providing a commentary of test performed, movement direction or starting position
- clearly stating your patient’s vertigo/dizziness self-rating during testing.

2.2 Technical

2.2.1 Installing / Reinstalling the Vesticam App

If you have purchased an Android Recorder with your Vesticam goggles unit, the Vesticam App will be already installed and tested.

You can install the Vesticam App if:

- you want to upgrade to a newer version of the Vesticam App
- you want to run the Vesticam App on your own smart phone. Note: Not all smart phones are compatible with Vesticam (see p4)
- your Android Device is not recognising the camera and is disconnecting. Reinstalling the Vesticam App might resolve this issue.

Installing from the shared folder (required for android 9.0 devices)

If you are using your own android smart phone or tablet as an android recorder, please contact support@vesticam.com for a link to the vesticamlogin shared folder.

1. Turn on the Android Recorder and unlock the screen.
2. Ensure the Android Recorder has internet access ie. WiFi is enabled  (refer below)
3. Uninstall your existing Vesticam App first by holding your finger down on the Vesticam App icon. When “Uninstall bin” appears at the top of the screen, drag the Vesticam Icon up to the Uninstall bin.
Note: Your existing Videos will not be lost when you Uninstall or Install the Vesticam App.
4. To install, go to Home Screen, then tap on the “Vesticam Info.” folder at the bottom-left hand side of the screen. Tap on “vesticamlogin” (this will open a shared folder on the Google Drive). Select “Vesticam Setup”. Select the apk install file eg. Vesticam App (v0.0).apk.
“For your security, your phone is not allowed to install unknown apps from this source” Select “SETTINGS” > “Allow app installs” turn “ON” then go back and “INSTALL”

5. Locate the Vesticam Icon  (just added) on the second home screen by swiping left. Press down on the Vesticam icon and drag it to the left and place it on the home screen.

 **Enabling WiFi** > Turn on Android Recorder > unlock screen > swipe down > select COG > Wireless & networks” > Wi-Fi > Select the Network you want to use > enter the WiFi password.... Connected !

Other Android Apps already installed on a supplied Android Recorder:



Vesticam.com official website



Vesticamlogin shared folder - Contains resources for clinicians. This includes **Vesticam Setup\Vesticam App.apk** .. for installing the App



Google Photos
Google LLC

Google Photos provides a feature to automatically sync your Vesticam mp4 videos to your Gmail account. Also, you can preview videos in Google Photos.



Simple Metronome
Ethan Brown

Simple Metronome - to assist with patient tests



Video Info Viewer
RoHo Mobile

Video Info Viewer shows you the Frames per second (FPS) of your Vesticam mp4 videos



File Manager
Mobile, ASUSTek Comp
Contains ads

“Files” or “File Manager” or similar App enables you to copy, move, or rename Vesticam mp4 videos. Also use this App to copy Videos to the DUAL USB 16GB Memory Drive. Vesticam Patient recordings are stored
Android Internal storage \ Vesticam \ Videos \ *.mp4

Useful Android Apps not pre-installed (can be added)



AirMore: File Transfer
APOWERSOFT LTD

Use **“Reflector”** to screen mirror to your PC/Laptop/Mac Screen for Rotary Chair testing or for presentations with others to a larger screen.

Not “pre” installed with your Vesticam Android Android Recorder.



WiFi File Transfer Pro
smarterDroid

Enables wireless file transfer of patient videos from Android to PC/Laptop/Mac

[Not Free]

Not “pre” installed with your Vesticam Android Android Recorder.

Notes regarding android apps:

- Uninstall any app by selecting the icon and dragging it to the “uninstall” Rubbish bin
- You can also use the Vesticam Login Folder to access the APK to install the Vesticam App

2.2.2 Organising and finding Eye Movement Video Recordings into Folders on your Android Recorder

Vesticam videos can be found in the Vesticam app “Video Library”. You can search for patient files names by patient ID, test, clinician, or date using the search button in the app.

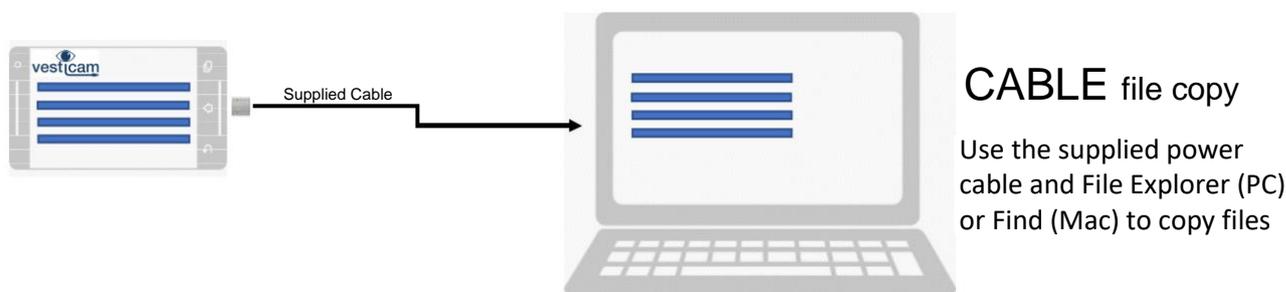
Video files are also saved to internal storage on your Android Recorder in “\Internal storage\Vesticam\videos”.

2.2.3 Transferring Videos (mp4 files) from your Android Recorder to Other Storage to Share/ Backup/Archive

To ensure the security of your Patient Video recordings, always follow your usual patient EMR pathways and transfer/copy the Patient Video files saved on the Android Recorder/smart phone/tablet to your organization’s required location.

4 ways to transfer Patient videos (mp4 files) from your Android Recorder or tablet:

OPTION 1: USING SUPPLIED CABLE



A: Using PC Windows Computer (Windows 10)

STEP 1

Hold the button at the side of your device and press “Restart” on your **Android Recorder** – **This is important to update the file system and file naming.**

Ensure your Android Recorder is ON and the screen is unlocked

STEP 2

Connect the USB cable/charging cable (provided) from the Android Recorder microUSB (charging port) to your PC USB port (for USB C ports, use the supplied adaptor).

Your **successful connection is usually confirmed with a “beep”** on PC and Phone and/or the automatic opening of Windows Explorer on the PC.

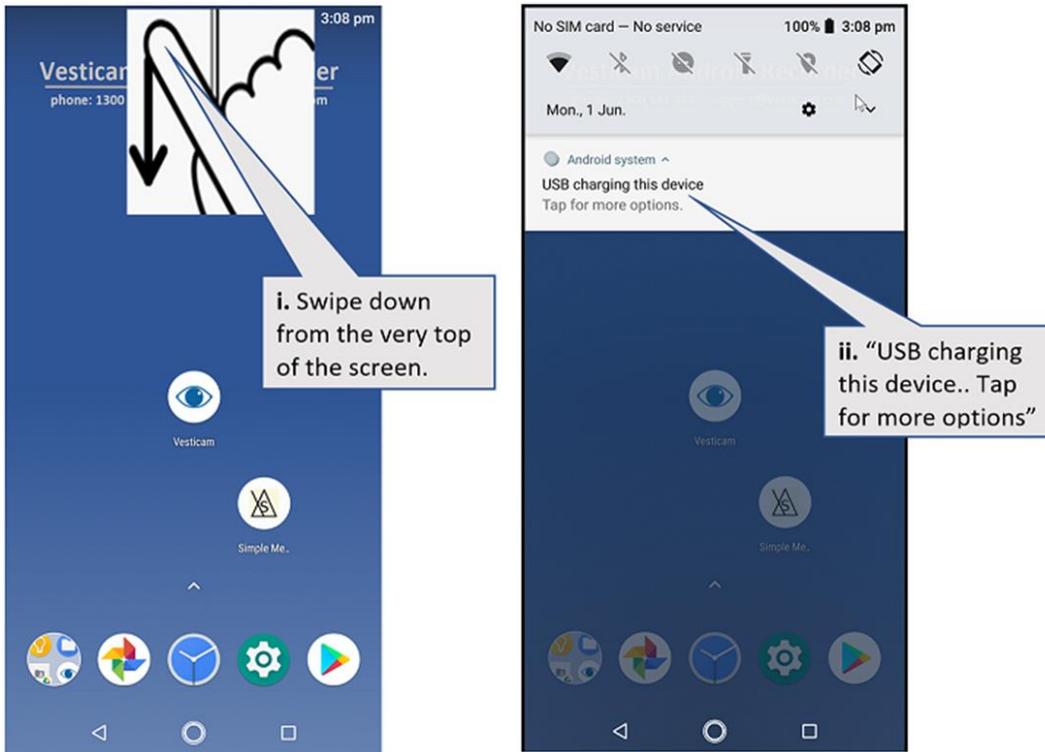
Note: Ignore any popup window eg. “Camera Upload Keep your memories safe” when connecting devices.

STEP 3

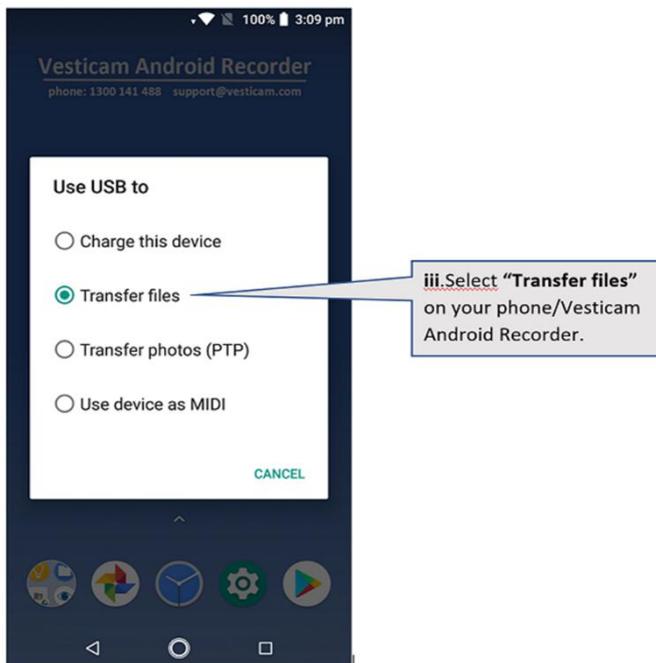
A notification box may pop up on your Android Recorder screen. Select “Transfer files”

If no notification box appears:

- i Swipe down from the very top of the device screen,
- ii “USB charging this device” appears. Tap screen for more options.



iii Select “Transfer files”



STEP 4

On your Laptop/PC open “File Explorer”

Open "This PC" then "Devices & Drives"

Click on the "Android Recorder" or other "<ANDROID PHONE NAME>"

Next, click on "Internal storage"... then "Vesticam" ... then "Videos"

The location for your Vesticam Videos is:

MyPC\\Vesticam Android Recorder\\Internal storage\\Vesticam\\Videos

STEP 5

Still on your Laptop/PC, Select and "Copy" the "Videos" folder on the Android Recorder then Paste in a folder on your PC (eg. a folder called "Vesticam Archives").

Once you have successfully copied the video/image files to the PC you can delete them from the Android Recorder.

B: Using Apple Mac (macOS 10)

PREPARATION – Download and Install the Android File Transfer utility on you Mac

<https://www.android.com/filetransfer/>



Android File Transfer

Follow **STEPS 1-4** as for PC Windows, above.

STEP 5

Still on your Mac ... Select and "Copy" the "Videos" folder on the Android Recorder then Paste in a folder on your PC (eg. a folder called "Vesticam Archives").

Once you have successfully copied the video/image files to the PC you can delete them from the Android Recorder.

OPTION 2: WITH MICRO-B USB MEMORY STICK /FLASH DRIVE



Dual Drive file

copy Use a USB Dual Drive and the Files App to copy files

Examples of flash drives: Verbatim 32GB Store N Go USB3.0/Micro USB Flash Drive, San disk Ultra Dual drive, or Kingston Micro Duo)

STEP 1

Insert the micro-USB memory stick into the Android Recorder

STEP 2

Open the Files App on the Android Recorder and navigate to the Vesticam folder - "Internal storage" ... then "Vesticam" ... then "Videos". Copy the Videos folder

STEP 3

Paste the Folder into the USB memory stick directory

STEP 4

"Eject" the memory stick in software before removing the memory stick from the phone

STEP 5

Insert the other side of the USB stick into a PC or Mac, copy files as usual. Remember to "Eject" before removal

OPTION 3: WITH WIFI CONNECTED, USING THE VESTICAM APP



You can upload individual Video files to Cloud Storage service (e.g. email, Dropbox, Google Drive) using "share".

STEP 1:

Connect your Android Recorder to WiFi

Access Android Settings Cog (hint from the top swipe down twice), select WiFi and enter locate the SSID and enter the password.

STEP 2:

On your phone use Google Play to install the cloud storage service you want to use (eg. Dropbox or Google drive).

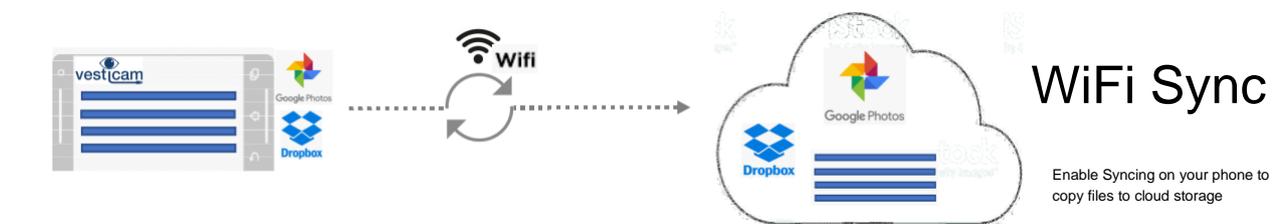
Note: If you can access your cloud storage on the Android Recorder then you can upload videos/images to that service.

STEP 3:

On the Android Recorder, Open Vesticam App > Image Library. Select the Video, select Send, select the destination eg. Dropbox or Google drive or Gmail/email.

Note: Video files exceeding 25MB cannot to emailed.

OPTION 4: WITH WIFI SYNC COPYING TO CLOUD STORAGE/ GOOGLE PHOTOS



Patient Videos can be set up to automatically upload to the Google photos library in your Google Cloud Drive. To enable this service, you need to turn Back up & Sync ON in the Photos App on your Android Recorder.

Turn “Back up & Sync” ON - for automatic upload of Vesticam Videos on your Android Phone to Google Photos/Cloud Storage. You only need to set this once.

 Photos App on the Android Device/Phone

Select **Menu** (top left hand corner)



Select **“Device folders”**

Select **“Videos”** ie. where Vesticam Videos are saved

Note: If this folder does not appear, you will need to open the Vesticam App and record one test video.

Turn **“Back up & sync”** ON

With **Back up & sync ON**, and **WiFi connected**, your saved Vesticam Videos will now be automatically uploaded to Google Photos in the cloud (via the Google Account that has been pre-setup on the Android Device/Phone).

STEP 1

Access “synced” videos On your computer, sign into <https://photos.google.com/> using your supplied google account. EXAMPLE LOGIN: vesticam10345@gmail.com Temporary Password = temp345abcd <<EXAMPLE!

STEP 2

Once logged into “Google Photos”, you can play, rename, organise and download your videos.

Sync. Warning: The Back up and sync is TWO WAY.... Deleting Patient videos on either the Android Recorder OR in Google Photos (via your Google Account) WILL DELETE THE PATIENT VIDEOS PERMANENTLY.

NOTE: Each Vesticam Unit is shipped with a unique Google Account Login (gmail email address) & Temporary. Your Google Account Login/email address & Temporary password are...

- provided via email (For Vesticam Unit Serials numbers from #100001 to 100100)
- stored on the Android Recorder in the bottom left hand corner of the home screen, in the “**Vesticam Info.**” folder. Select “**Notes**” refer “**Google Account Temporary Password**” (For Vesticam Unit Serials numbers 100101 and beyond)
- Available on email request to support@vesticam.com

**** GOOGLE ACCOUNT PASSWORD CHANGE****

Change the temporary password supplied to your own “new” confidential password.

To do this

- 1) login into your Google Account via <https://accounts.google.com/service/login>
- 2) Go to **Personal Info**, then select **PASSWORD**.
- 3) Setup your own “new” confidential password.
- 4) Also update other personal info and account recovery email & mobile.

Note: Your “new” password will also need to be entered on your Android Recorder.

2.2.4 Recording Using your PC or MAC

You can view and record by connecting your Vesticam monocular goggles directly to your PC Laptop or Mac.

Standard “Camera” or “PhotoBooth” software, which comes preinstalled on most PC /MAC computers, will allow viewing and recording from Vesticam IR video goggles. This is a simple technique and does not require extra software (see below)

As an option, you can choose to install other software and configure it to meet your specific requirements eg: adding a room camera, extra labelling options, toggling between cameras (see appendix 2 for set up details).

Micro-USB to Type A USB, and micro USB to C adaptors for connecting the camera to the computer are supplied with all Vesticam IR video goggles.

If you choose to use your PC Laptop or Mac for recording, we recommend using the supplied high-speed extension cable. This allows you to have your laptop on a nearby desk or chair when your patient is on a treatment couch. Not all extension cables are suitable to transmitting data at the required speed and quality. Cables must be OTG compatible.

Before you start, **check that the PC Laptop or Mac meets the requirement of having a built-in camera and being able to record and play sound and video.**

RECORDING/ PLAYBACK PC (Windows 10)

Connect the Vesticam camera lead directly to your computer USB port (adaptors provided if needed). **Do not use a USB hub to connect.** Open “Camera” software (Windows 10).

Use “Change Camera” to switch to the USB camera (ie. not “Main Camera” and not “Front-facing Camera” but “USB 2 HD Camera”). Once you have switched to USB camera, you are able to preview and record from the Vesticam camera. Recordings are saved in “Camera Roll” (Usually found at C:\Users\\Pictures\Camera Roll). Saved MP4 videos can be played, renamed, shared, backed up.

RECORDING/ PLAYBACK MAC

From Launch Pad open “Photo Booth” software (MacOS 10.x). In “Photo Booth” select the “Film” icon to “Record a movie clip” (located in the bottom left of screen). You will see the preview from the inbuilt face camera.

Connect the USB convertor plug (provided) to the micro USB plug at the end of the Vesticam camera lead.

NOW connect the USB convertor to your PC/Mac USB port.

The Vesticam camera should now be previewing. Record from the Vesticam camera by selecting the Red Video icon. Recordings are saved in “Photo Booth”. Saved images (mp4) can be played, shared, or use File> Export to rename or copy to another folder.

2.2.5 Screen Casting your Android Device to a Larger Screen

You can easily “cast” your android screen to other devices (PC/Mac) wirelessly **when they share the same WiFi connection.**

This might be useful when using your Android Recorder for:

1. Presentations (eg. conference or education setting) - you can project to a chosen larger screen, or share screens in different areas real time whilst testing, without use of cables.
2. Modified Emory Rotatory Chair testing – allows real time viewing and recording of eye movements while the chair is spinning.

Android App: "AirMore"

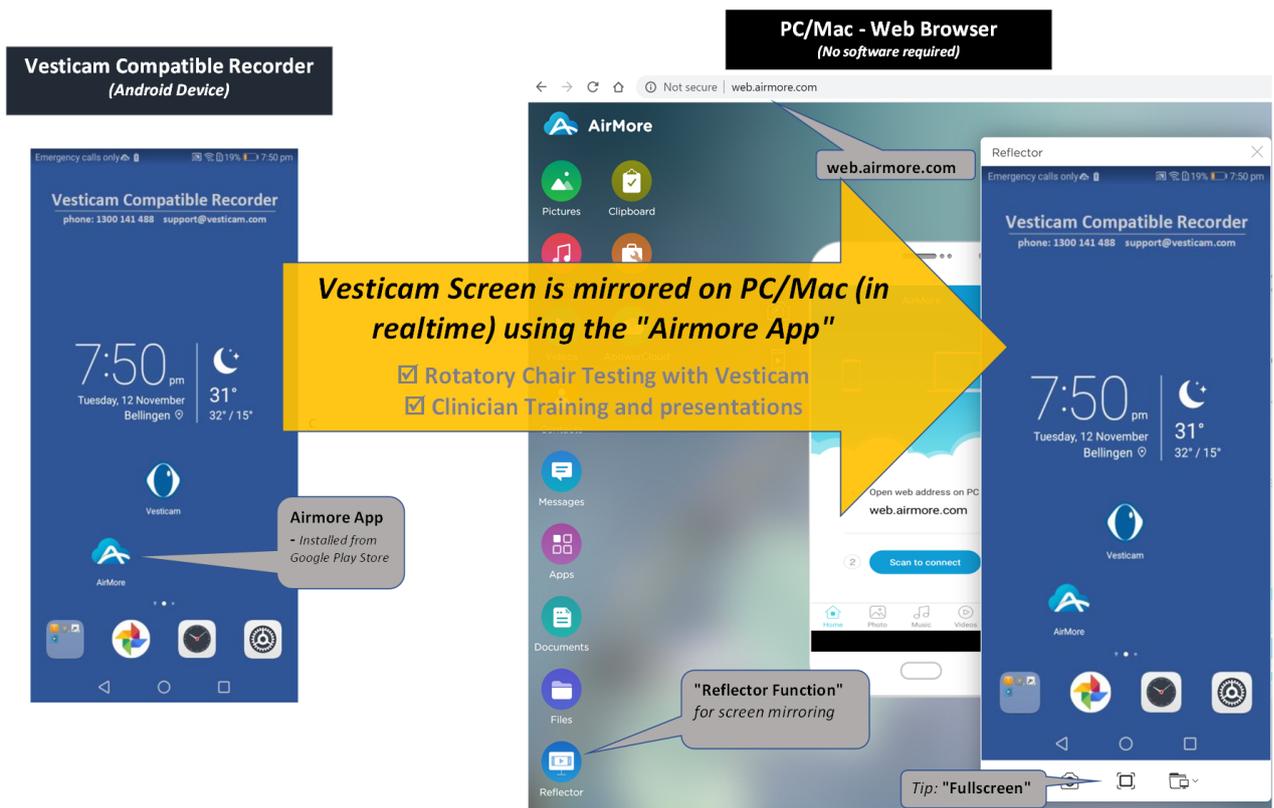
AirMore is a web-based application that features the reflector function to display your Android screen in real time. Using AirMore, you do not need USB cables to build the connection. All you need is your web browser and a stable and shared WiFi connection.

To use the "Reflector Function" of AirMore, follow the steps below.

Steps for screen casting using the Airmore App.

1. On your Android Recorder install the App: "AirMore: File Transfer" from Google Play.
2. On your PC/Mac browser open web.airmore.com
3. On your Android Recorder scan the QR code shown on the PC/Mac screen.
4. Once connected, click on the "Reflector" icon on the main interface of the browser on PC/Mac.
5. Click "START NOW" on your mobile device.
6. SUCCESS The Vesticam App (on the Android Recorder) is also displayed (mirrored) on the PC/Mac.

- Pros:**
- ✓ Easy to use
 - ✓ AirMore is a free android app.
 - ✓ Works for all popular browsers such as Google Chrome, Firefox, Safari, etc.
 - ✓ No extra software installed on Windows and Mac operating system.



3. Vesticam2 Binocular IR Video Goggles

3.1 Clinical

3.1.1 Setting up and using Vesticam2 Binocular IR video goggles with OBS

The following section is for clinicians wanting to use Vesticam2 for binocular viewing and recording. With a PC/Laptop/Mac that meets the minimum requirements, OBS Studio software and the Vesticam binocular equipment, clinicians can preview & record both patient's eyes at the same time.

The Binocular Vesticam equipment requires additional components (2nd Camera, Dual cable, Laptop) that can be added to existing Vesticam monocular equipment. This means you can purchase and use different components to meet your clinical testing needs.

This Vesticam designed setup (using OBS Studio software) provides vestibular clinicians with a feature rich solution for binocular recording. Initial setup of OBS is explained in the separate document "Vesticam2 (Binocular or Monocular) OBS Studio software user manual". Installation is usually only required once, in the initial phase of setting up your computer, and should be carried out by the expected user and without patients present.

OBS is freeware provided under a General Public Licence. More information about freeware General Public Licence can be found here <https://www.gnu.org/licenses/old-licenses/gpl-2.0.html>

Once suitable software is installed correctly, you can proceed with clinical use of Vesticam2 Binocular IR video goggles.

CONNECTING THE VESTICAM CAMERAS TO YOUR COMPUTER

1. **Switch computer ON**
2. Connect the Vesticam camera plugs to the dual extension lead 2.0metre
3. Connect the Extension lead USB Type-C (male) to the labelled Computer ports. If needed, use the supplied adaptors for USB-A. There should be an **audible beep** (Windows only) which confirms the camera is correctly connected.

If possible, keep the adaptors and extension lead connected to the cameras to reduce wear or damage to the computer ports.

4. **Once the cameras are connected, open OBS Studio** by double clicking on the icon
5. **Both eyes and room camera should now be visible on the screen and respond to motion.**

If the images are frozen and do not respond, simply exit OBS studio and reopen it.

If there is still no response exit OBS studio, remove and reinsert adaptors. There should be an audible beep which indicates that the camera is connected.

6. **Labelling the eye movement video:**

Left Click on "Patient: ..." the box should appear highlighted with a **red coloured outline**.

Right Hand mouse then select **"Properties"**

Edit the **Text section** to update the **"Patient: EXAMPLE, J"** or name then select **"OK"**.

Repeat for **"Test(s): ..."** and **"Clinician"** (if required)

TIP: Sources **Patient: ...**, **"Test(s): ..."** & **"Clinician: ..."** must be unlocked  to enable edit.

The Patient, Test and Clinician details will be recorded on the video. These settings will NOT change the mp4 file name. The file name can be edited after recording.

7. The default Scene displayed is **B Both eyes - Binocular** (Alt + B).
For monocular (single eye) preview/recordings select the Scene **R Right eye only** (Alt + R) or **L Left eye only** (Alt + L)

SETTING UP THE BINOCULAR IR GOGGLES ON YOUR PATIENT

1. Start with the camera cylinders off...not attached to the goggles
2. Follow your normal patient hygiene pathways when applying the goggles. Use effective alcohol/anti-microbial wipes to clean goggles face plate, silicone eye cups and head band before and after each patient. Do not use on patients with infective disorders. (see also 3.1.2 "Cleaning and avoiding contamination" and Appendix 1 full instruction manual)
3. The goggles are comfortable, high quality and flexible enough to fit most face shapes and sizes. Loosen the head strap by squeezing the quick release buttons and the goggles flange together
4. Help your patient to position the goggles for comfort. Most patients can do this themselves, like swimming goggles.
5. To adjust for interpupillary distance, loosen the locking rings at the front of the mounting plate by turning anti-clockwise. Allow the mounting plates to slide into a comfortable position on your patient's face. Your patient should be able to see out of both viewing holes.
6. Pull rubber tags at each side of goggles to tighten gently, and then lock the mounting plates into place by firmly tightening the locking rings in a clockwise direction.
7. Hold the first (right) camera cylinder so that the lead is exiting the cylinder at "5 o'clock". Insert the camera cylinder into the mounting plate, and rotate it clockwise until the camera cylinder "clicks" and locks into place (lead should be at "6 o'clock" when locked).
8. If you cannot see your patient's eye completely on the viewing screen, simply loosen the locking ring, realign the camera, and retighten the locking ring.
9. TO FOCUS and fine tune eye position use one hand to stabilize the camera cylinder and the other hand to move the camera joystick up / down and side / side until the eye image is central on screen. Firmly pull camera joystick in / out to focus the image of the iris and edge of the pupil. The camera cannot be pushed into the eye as there is an end stop. It is important to focus the eye to ensure that possible torsion is visible.
10. Repeat the instructions above (7 -9) to position the second (left) camera.

TO ALLOW FIXATION:

11. Press the small button at the end of the joystick to activate the fixation light. When the button is IN, the fixation light is ON. When the button is OUT, the fixation light is OFF.
NOTE: the fixation light will only work when the camera is plugged in to the external recording device (phone, tablet or computer).
12. If you wish to use "room view", position the room camera (optional extra) or computer external camera to view your patient.

Vesticam2 goggles are designed to be light tight. Adjust the goggles with your patient so they are comfortable, secure, light tight, and firm.

If you have further questions or concerns please check www.vesticam.com/support or email support@vesticam.com

3.1.2 Recording using OBS Software

Once the views from cameras are visible and in focus, and the room camera is in position:

1. Press “**Alt + X**” to start **AND stop recording**. The recording time in the bottom right corner of the screen should show seconds changing/time change. ie: ● REC: 00 : 00 : 01
2. Press “**Alt + Z**” to **Pause** and to un-pause.  in the bottom right corner of the screen.
3. Change Scenes if required.
 - Alt + B** ... to record both eyes by selecting scene: **B Both eyes – Binocular <DEFAULT>**
 - Alt + R** ... to record right eye only by selecting scene: **R Right eye only**
 - Alt + L** ... to record left eye only by selecting scene: **L Left eye only**
4. Timer starts with the recording “**Alt + X**” or with “Alt + 9” Use “**Alt + 0**” to reset timer to **00:00**

The set up and layout of OBS are automatically saved, even if you exit the software.

Note : OBS will record audio. *Speaking while recording can assist with identifying subjective responses to different tests, recording verbal consent if required and naming vestibular tests. For example, you can start recordings with: “(patient’s name), are you happy for me to record this test”. While recording, you can also provide a commentary of tests, movements, positions and observations of your patient.*

REVIEWING VIDEOS with VLC Media Player software

1. In OBS Studio, go to **File** (top left of screen). Click **Show Recordings**.
2. **To review video** simply **double click on the required video**.

Note: Consider installing a Video Player that can replay at half speed (eg. [VLC Media Player](#))

Rename Videos

In OBS Studio, go to FILE (top right of screen). Open (double click) “Show Recordings”.

To rename your patient eye movement video **click once on the file name** and insert the required details.

To retain the date sort order of the file list, add details after the date and time.

Eg: Original Example: Vesticam 2025-12-31 09-10-35.mp4

Changed example: Vesticam 2025-12-31 09-10-35 SMITH, J .mp4

See also Appendix 2, or contact support@vesticam.com if you require a copy of Appendix 2, or more information on OBS studio.

Troubleshooting

If the cameras are not working in OBS Studio:

1. Exit OBS and reopen OBS Studio. Cameras still not working?
2. Exit OBS Studio, disconnect and reconnect the cameras at the USB port. Now reconnect and listen out for the audible beep (Windows PC) of the computer recognising the camera. Reopen OBS Studio. Cameras still not working?

3. In OBS, check the cameras in the Source list are linked to the correct devices. (see page 12) Cameras still not working?
4. Exit OBS, restart the computer, reconnect cameras and then reopen OBS Studio. Cameras still not working?
5. Exit OBS Studio, exclude the extension lead 2.0metre and reconnect the cameras at the USB Port, now reconnect and listen out for the audible beep (Windows PC) of the computer recognising the camera. Reopen OBS Studio. Cameras still not working?
6. Instead of OBS, test the cameras using your standard video recording software (Windows Camera or Mac PhotoBooth). Cameras still not working?
7. Contact Vesticam support

We welcome you contacting Vesticam support: support@vesticam.com to

- book a time for Vesticam to setup OBS Studio remotely and provide a handover (approx. 45mins)
- seek a resolution to an issue with the equipment or software
- provide feedback of your experiences, suggestions for improving the documentation, or anything else.

3.1.3 OBS - Tips for Working with Video Recordings

Speaking while recording can assist you with identifying your patient's subjective responses to different tests, recording verbal consent if required, and naming vestibular tests.

For example, you can start recordings with: "(patient's name), are you happy for me to record this test". While recording, you can also provide a commentary of tests, movements, positions and observations of your patient.

3.2 Technical

3.2.1 Customizing OBS for use with Vesticam

Please refer to SEPARATE INSTRUCTIONS PROVIDED IN APPENDIX 2 "Vesticam2 (Binocular or Monocular) OBS Studio software user manual ". These are a reference of suggestions to customize OBS freeware to support easy clinical use with Vesticam2 IR video goggles.

Vesticam provide the necessary support and guidance for configuring OBS software so that it is relevant for monocular and binocular vestibular testing. The OBS source code is unchanged. OBS is provided at no cost, and is freely available. Customers may be invoiced for assistance provided in the physical act of transferring a copy of OBS with suggested modifications.

The Vesticam Support team can assist by email, phone or screensharing to ensure the setup is complete and the equipment works to its specifications.

4. Maintenance/General Information

4.1 How to care for your Vesticam Unit

4.1.1 General care:

- **Avoid heating over 40oC.** Never leave your Vesticam unit in a hot car
- Avoid dropping your Vesticam unit
- Always keep the camera dry
- As Vesticam2 IR goggle units are not “therapeutic or diagnostic tools” and do not provide a measurement or trace, they do not require regular calibration
- For Vesticam2 servicing or repair contact support@vesticam.com
- Do not use the Vesticam IR goggle unit if it is showing any signs of damage. If you are unsure, please contact Vesticam support (support@vesticam.com)
- Take care when connecting and disconnecting the camera or any adaptors to your recording device. The USB ports can be damaged if not used correctly
- Please follow your normal service and maintenance pathways for maintenance of the charging attachments and usb 240v wall socket charger supplied with your recording device
- Lock your Vesticam unit with your other medical equipment/medical records after use. Remember that your recording device may contain videos of your patients, and these should be treated as medical records.

IMPORTANT: it is the user’s responsibility to follow their usual medical record pathways and recommendations for storing patient eye movement videos. To secure patient data it is important to regularly transfer patient videos into the usual or required medical record storage system, and then delete them from the phone.

4.1.2 Cleaning and Avoiding Contamination

Vesticam is listed as a non-critical, low risk medical device (ARTG class 1) which can be used in contact with intact skin (like stethoscopes, BP cuffs, and head and chin rests as used by optometrists).

It must be clean, and the sections in contact with patients’ skin must undergo low/intermediate level disinfection.

These guidelines are aimed at providing information to assist Vesticam IR video goggle users in minimising the risk of transmission of infection. Persons proposing to use Vesticam IR video goggles for medical purposes must rely on their own medical and legal judgment. Vesticam IR video goggle users are solely responsible for implementing and following standard cleaning and infection control pathways as recommended by their association and/or workplace. Use of PPE and general environmental cleaning is not included in this manual and is the responsibility of the user.

- Follow your normal patient infection control pathways when applying Vesticam goggles
- Use of PPE and general environmental cleaning is the responsibility of the user
- Use of Vesticam IR video goggles may be contraindicated in patients who are infectious or have broken skin
- Remove the camera cylinder prior to cleaning

- Use effective anti-microbial and antibacterial wipes (or alcohol wipes) to wipe over and clean the silicone eye cups, goggles mounting plate, head band and any exposed surfaces before and after each patient. Allow the goggles to sit for 60 seconds, and to air dry before use
- Do not autoclave. Do not use hard or pointed objects to clean any part of the Vesticam unit
- Do not allow liquid to enter any part of the goggles camera unit. The Vesticam camera lens (visible when looking into the camera cylinder) should be checked regularly for stains and dust and should be cleaned as required using a standard spectacle lens cloth
- The silicone eye cups can be removed, washed and air dried separately and then placed back onto the mounting plate if required. Extra eye cups are available for purchase
- The goggles mounting plate, head band and eye cups can be immersed in gentle cleaning detergent, rinsed and allowed to air dry completely if required.

See Appendix 1 for references and additional information.

4.2 Features and Specifications

TECHNICAL SPECIFICATIONS: Medical Equipment, Vesticam2 IR Video Goggles	
Camera	Wired <ul style="list-style-type: none"> • USB Type-C, or • USB-A [2.0+] for PC/Mac/Laptop (via supplied adapter), or • USB Micro-B for Android with Micro-B (via supplied adapter) Lead length = 1.0m + USB Extension lead 2.0m (supplied) = 3.0m Frame Rate: 30fps+ Resolution: 1080P Illumination: IR LED lights x 7 Fixation Light: LED (Green) x 1 Focus adjustment: range 14mm
Goggles, camera cylinder and eye patch cylinder	Material: Nylon P12 Interpupillary adjustment range: 90mm – 55mm Light tight seal: removable Silicon Gaskets (Left/Right) Fastening mechanism: Silicon band: Adjustable 230mm – 420mm Dimensions: 170mm (Width) x 50mm (Height) x 65mm (Depth) Weight: 130g
Accessories (included)	USB Extension Lead 2.0m USB OTG Adapters x 2 Actual size Inner ear model (L)
Case	Dimensions: 210mm x 290mm x 90mm, Dual zip release with zipped internal pocket and internal foam compartments
For binocular viewing (optional extra)	+ 2nd Vesticam Camera unit + Custom Dual USB Extension Lead 2.0m + USB OTG Adapters x 2
Android recording device (optional extra)	OTG (Type-C) Vesticam App 5.0 (preinstalled) Metronome App, Airmore App Protective Silicon Case & Stand/clip & Custom branded Lanyard Charging lead and plug

Please refer to your supplied device documents for specific features and specifications.

Video recording details:

The video size for Vesticam recordings varies, but is approximately 15mb per minute, therefore a patient video recording of 5 minutes will result in a 75mb mp4 video file.

Vesticam Support estimate that a 64GB Android Recorder (with 20GB of available space) has the capacity for more than 800 video recordings!

Frame Rate: 25 frames per second is required on a video to observe nystagmus and most covert saccadic movements of the eye.

Vesticam2 videos are recorded at 30 frames per second (fps). The current maximum recording rate for the USB camera is 30 fps.

4.3 Legal, Safety and Regulatory Information

Australian Register of Therapeutic Goods (ARTG)

Vesticam IR video goggles are listed by ARTG as #301218

International Approval

Vesticam is sponsored and available for purchase in New Zealand through our NZ sponsor. Please contact us for more information.

Other international clinicians can purchase Vesticam goggles if they agree:

- To use the goggles “For Research Purposes Only”.
- To be responsible for paying any customs/duties/taxes/import fees required by your country.
- To recognise that there may be limitations and delays related to time differences.
- Shipping costs are the responsibility of the purchaser.

Patent

Vesticam has a light and easy-to-use patented adjustment system.

Trade Mark

The “Vesticam” is a trademark owned by Vesticam Pty. Ltd.

Hold Harmless Clause

Persons proposing to use Vesticam2 IR video goggles for a medical purpose must rely on their own medical, clinical and legal judgment, and such persons shall be solely responsible for the suitability of our product for any medically-related applications.

The purchasing party and/or practicing clinician agrees to indemnify, defend, and hold harmless Vesticam Pty Ltd from and against any loss, cost, or damage of any kind, including loss or damage may arise from non-performance or defective performance; damage to real or personal property of purchasing parties or third parties; injuries suffered by employees, sub-contractors or the general public.

Health records and privacy

Health information is regarded as one of the most sensitive types of personal information. For this reason, the *Privacy Act 1988* (Privacy Act) provides extra protections around its handling. Video recordings of the eye and associated audio recordings are considered protected health information and should not be shared without the

patient's consent. Purchasers are required to follow their usual patient record sharing pathways when sharing eye movement videos.

Vesticam is not responsible for the protection of any patient health data, or for any diagnosis made by practitioners based on Vesticam videos.

To reduce any risk to the security of patient health data, Vesticam recommends that patient eye movement videos are not stored on any portable device but are deleted or uploaded to the purchasers usual safe and central health record system.

Guarantee

30 day money back satisfaction guarantee on purchase.

If for any reason you are not satisfied with your Vesticam IR video goggles, simply e-mail support@vesticam.com in the first 30 days from delivery and we will fully refund your money (less shipping costs).

Camera units may also be exchanged (eg: non-fixation light to fixation light) at the cost differential and shipping cost within the first 30 days from delivery.

Full 1 year replacement guarantee on parts and software.

Vesticam2 IR goggle manufactured parts, your supplied Recorder, camera, and software come with a full two year guarantee, when used according to instructions.

The Vesticam2 IR goggle system is lightweight and moderately robust. Treated with care, it will last many years. The electronic components should not be left in very hot areas or exposed to water. Please check your user manual for care instructions.

Vesticam2 Pty Ltd will not be held under responsible if any repairs are made on the system components without authorisation by our support team, or if the unit is not used in accordance with the supplied instructions.

Liability is limited to the replacement cost of the relevant components. If you are based in Australia, our turn around on parts and servicing etc is 4 working days (2 days shipping each way).

Vesticam specifies a 3 year lifecycle for Vesticam2 IR video goggles (monocular and binocular).

4.4 Contacting support

Your feedback is valued and helps us to improve the Vesticam2 IR video goggle solution for clinicians.

If you have questions or concerns, please check www.vesticam.com/support or email support@vesticam.com
We want your Vesticam2 IR video goggles working well for you!

APPENDIX 1: Effective Cleaning of Vesticam IR Video Goggles, References

1. Instilling a culture of cleaning: Effectiveness of decontamination practices on non-disposable sphygmomanometer cuffs

Zimmerman P, Browne M, Rowland D. *Journal of Infection Prevention*, Volume: 19 issue: 6, page(s): 294-299

This recent study from Australia tested whether disinfection of blood pressure cuffs using disinfectant wipes was an effective (and cost saving) option. A sample of 54 non-disposable sphygmomanometer cuffs were collected from a rural emergency department and tested for bacterial contamination before and after decontamination using Clinell Universal Wipes. Levels of contamination were significantly lower following decontamination with the wipes; 29% of the cuffs had no growth before decontamination compared with 98% after decontamination. The authors concluded that using wipes to decontaminate non-disposable cuffs would be clinically effective, environmentally friendly, and cost-saving compared with using disposable cuffs.

“Decontamination of non-disposable sphygmomanometer cuffs decreases microbial load and risk of HAI, providing evidence to negate arguments for disposable cuffs while being environmentally sensitive and supportive of a culture of patient safety and infection control”.

2. Contamination of blood pressure cuffs by methicillin-resistant staphylococcus aureus and preventive measures.

Matsuo M, Oie S, Furukawa H. *Ir J Med Sci*. 2013;182(4):707-709.

This study sampled pressure cuffs in wards and outpatient clinics at an acute-care hospital in Japan. The cuffs were sampled on the inside (skin-contact side) using gauzes. Of the 30 cuffs sampled, 11 (31.4%) were contaminated with MRSA! The team also evaluated two different methods of disinfection: an outsourced washing process and wiping with 80% ethanol. No cuffs were found to be contaminated following either disinfection process.

Only a small number of cuffs were included in the disinfection study, and they weren't sampled before and after treatment, but these findings reinforce that blood pressure cuff disinfection is an option.

3. Effectiveness and feasibility of using a physical barrier device in reducing rates of microbial contamination of sphygmomanometer cuffs

Nitin Bhanot et al., *Journal of Infection Prevention*, 2011

“Sphygmomanometers are frequently contaminated with bacteria and are implicated in the transmission of microbes. A pilot study was conducted to determine the effectiveness and feasibility of using a physical barrier device in reducing rates of microbial contamination of sphygmomanometer cuffs. A disposable plastic device acting as a physical barrier may not reduce surface contamination of sphygmomanometer cuffs.”

4. Infection control guidelines for optometrists 2016†

Lian K; Napper G; Stapleton J

First published:09 June 2017

Downloaded 27/3/2020 <https://onlinelibrary.wiley.com/doi/full/10.1111/cxo.12544>

Infection control guidelines for Optometrists 2016 recommends the use of 70% alcohol swab and air drying in non-critical reusable equipment, if infection is suspected.

APPENDIX 2: Vesticam2 (Binocular or Monocular) OBS Studio software user manual

Please contact support@vesticam.com to request this as a separate document.