

NICON \ V A L K Y R I E



QUICK START GUIDE

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Vicon Valkyrie hardware meets the applicable requirements and standards. It is not for medical usage, nor is any fitness for medical usage implied.

For regulatory information relating to Vicon Valkyrie, see also [Vicon Valkyrie regulatory, safety and warranty information](#) on the Vicon documentation website.

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Revision 2, 06 March 2023

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## Valkyrie handling recommendations

Before you unbox your new camera, learn the right way to lift and carry it, and maintain its IP65-rated protection.

- ⚠ Although Valkyrie cameras are IP65-rated, the other components of your Valkyrie system (switches, Locks, other cameras, etc) may not be, so ensure that these components are not exposed to unsuitable environmental conditions.

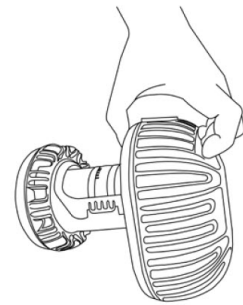
### Carry and mount your camera correctly

✓ Always use the grip point at the top of the camera to pick up your Valkyrie camera (as illustrated, right).

✗ Do not pick up the camera in any other way, such as by the lens.

To avoid drift due to mounting issues:

- ✓ Ensure all camera mounts are fully tightened.
- ✓ Try to position cameras and mounts so that the center of mass is above or below the load attached to the pivot point, for example, use the tripod head to angle the camera, and do not tip both the camera and mount.
- ✓ Avoid fluctuating temperature in the rigging: braced poles (such as Trilite) or tripods work better than single poles. Calibrate with the cameras and their environment at a constant temperature.



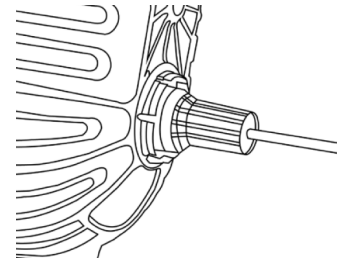
### Maintain your camera's IP65-rated protection

✓ If you need to remove the IP65 cable cap that protects the connection between the Ethernet cable and the camera, ensure that you remove and replace the cap correctly (see [Remove and replace IP65 cable cap, page 4](#)).

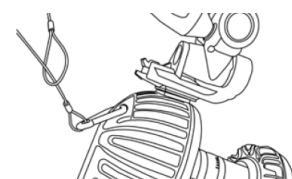
✓ To adjust the focus, aperture, or zoom, you must remove the IP65 lens cover. To do this, holding the camera body (not the lens), carefully unclip one side of the cover first, and then ease off the cover from the other side.

To replace the cover, hook one side of the clips on the cover, then rotate the other side on, with your thumb overhanging the clip area for extra leverage. Supporting the underside of the lens, push firmly downward over the clip until it clicks into place. Check both clips are in place and the cover is correctly positioned over the lens.

✗ If the lens cover and IP65 cable cap are not fitted or are incorrectly fitted, the camera is no longer IP65-rated.



- ⚠ **Warning:** If the cameras are mounted where they may fall and injure people or damage equipment, tether them to their mounts with safety bonds (see [Tether a camera, page 10](#)).



## Remove and replace IP65 cable cap

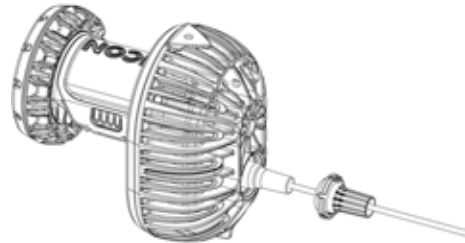
**Caution:** To maintain IP65 protection for your Vicon Valkyrie cameras, ensure that if you remove IP65 cable caps (and/or lens covers), you replace them correctly, as described below.

### Remove an IP65 cable cap

To remove the Ethernet cable from a Valkyrie camera, you must first remove the cable cap and seal.

- 1 Hold the camera by its body, NOT by the lens.
- 2 Push inward on each of the segments around the edge of the outer cap until it loosens, then pull the cap gently backward along the cable.
- 3 Pull the seal backward along the cable.

You can now detach the RJ45 connector of the Ethernet cable from the back of the camera.



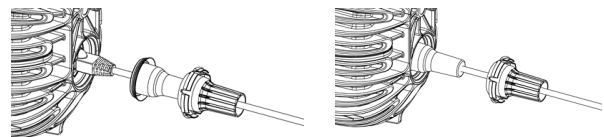
### Replace an IP65 cable cap

If you remove an IP65 cable cap from a Valkyrie camera, to maintain the camera's IP65 rating, you must replace the cap correctly, as described in these steps.

- 1 Insert the RJ45 connector on the Ethernet cable into the port at the back of the Valkyrie camera.

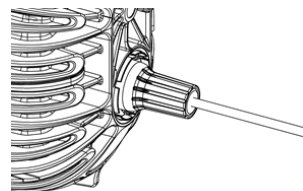


- 2 Push the seal into place and ensure it sits flat within the circular recess around the connection.



- 3 Push the cap into place over the seal until the rounded clips on the edge of the cap clip into the groove in the metalwork.

Note that if the seal is not correctly fitted, you will not be able to clip the cap into position.



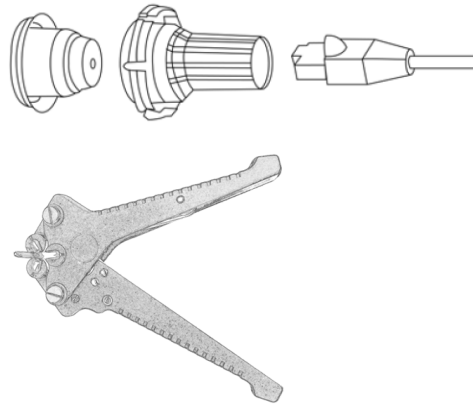
## Add IP65 protection to Ethernet cable

**Caution:** These instructions apply only if you are adding a Vicon-supplied cap and seal to an RJ45 Ethernet cable (minimum Category 6 (Cat 6) standard). Use of parts obtained from third parties or failure to protect your Ethernet cable correctly, as described below, will invalidate the IP65 protection and the warranty of the camera.

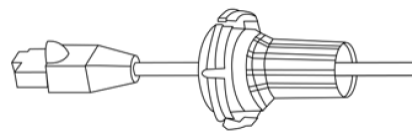
**1** Ensure you have the required parts:

- Waterproof cable cap and seal (obtained from Vicon: part number VKSC-B)
- Cat 6 RJ45 cable (30m or 50m, depending on your requirements)

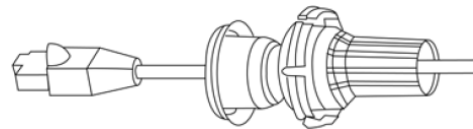
Ensure you also have a suitable cable sleeve expander tool (also known as sleeving pliers), such as these [sleeving pliers](#)<sup>1</sup>.



**2** Take one end of the cable and thread the RJ45 connector through the end of the cap that has the smaller opening.



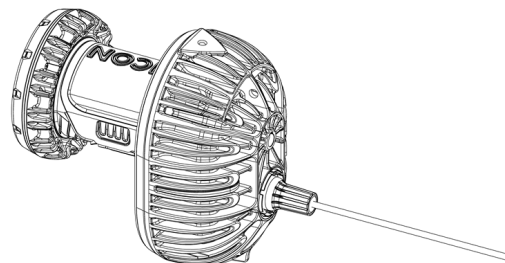
**3** Insert the prongs of the cable sleeving pliers into the hole in the seal and squeeze the handles to widen the hole so that you can thread the RJ45 connector through the smaller opening.



Push the connector far enough through the seal to be clear of the pliers.

Release the handles and remove the pliers from the seal.

**4** When required, connect the cable to the camera and fit the cap and seal over the connection as described in [Replace the IP65 cable cap, page 4](#).



**Caution:** To ensure Valkyrie cameras remain IP65-rated, ensure you always remove and replace the IP65 cable cap correctly. For instructions, see [Remove and replace IP65 cable cap, page 4](#).

<sup>1</sup> <https://www.facom.eu/uk-en/professiontools/productdetails/hierarchy/7658/catno/985763/>

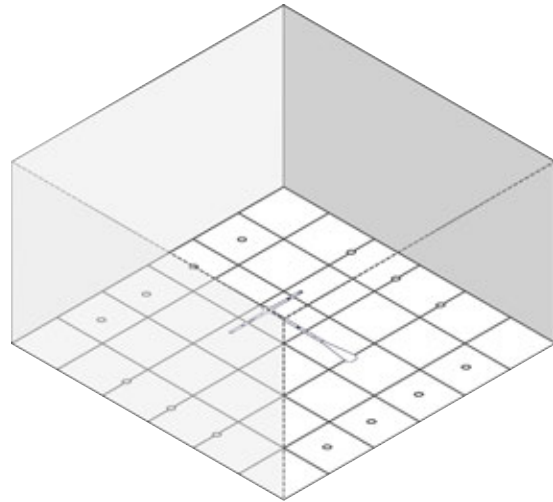
## Set up your Vicon Valkyrie system

### Define the capture volume

To define the volume:

- 1 Place markers around the edges of the volume to indicate the intended capture volume. You can often place the markers on the floor. If the volume to be captured is higher up, place the markers accordingly. This makes it easier to visualize the capture space.
- 2 Position the cameras around the volume to provide full coverage across the volume (see [Install the cameras, page 6](#) and [Position the cameras, page 13](#)). Positions will depend on the volume size and shape.

- ✓ To help with camera positioning, use Valkyrie's Video Preview mode, which enables you to view a low-resolution image of the whole scene (see [Video Preview mode, page 13](#)).



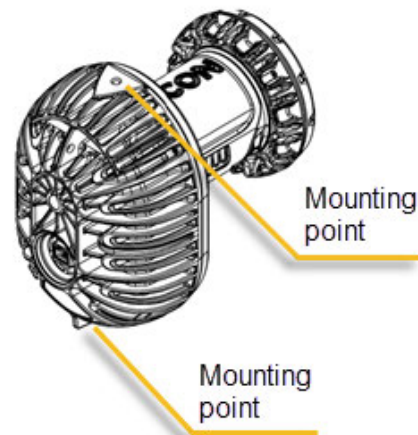
### Install the cameras

- ⚠ Installation must be carried out by trained, experienced personnel only.

Your Valkyrie camera has two mounting points, top and bottom, to provide flexibility on mounting and orienting the camera. These mounting points have 1/4" 20 UNC threaded holes, which match the thread found on most tripod and wall-mount fixing screws.

Ensure the camera is rigidly mounted by clamping it securely to a rail or mounting on a tripod. For both options, you must attach the camera to a mounting head.

- ⚠ **Caution:** Ball head mounts and clamps are not suitable for mounting Valkyrie cameras.



- ⚠ To pick up your Valkyrie camera, always use the grip point at the top of the camera (see illustration, [Valkyrie handling recommendations, page 3](#)).





## Prepare a clamp

If using a clamp, you must prepare it by fitting the stud that comes with the clamp into the slot at top of clamp.




To do this:

1. With your fingers, loosen the screw on the side so that it doesn't protrude through the slot.
2. Press the silver button on the side of the clamp and drop the stud into the hole, leaving the larger side of the stud exposed.
3. Release the button and tighten the screw on the side again so the stud is held firmly in place.
4. The mounting head can then be screwed into the top of the clamp, using the stud.
5. Fit the clamp onto the railing by opening the clamp, attaching it to the rail and tightening the clamp until it is secure on the rail.

 Ensure the clamp is secured tightly enough to prevent any movement of the camera.


 If you're using a rail or truss, before installation, ensure that the diameter of the rail is of a suitable width for use with the clamp.

## Tips

-  Typical rail systems have circular cross sections. For rails with rectangular cross sections, insert the accompanying wedge into the clamp to maximize the grip surface.
-  Secure the clamp to the rail in the desired orientation (eg, for mounting the camera on top of the rail or suspending the camera below it).
-  If the head has a "quick release" camera mount feature, remove the mounting plate before securing the head to the clamp.

## Prepare a tripod

To use a tripod, ensure the screw and thread match and screw the tripod head directly onto the stud on the top of the tripod.

 **Caution:** When locking a tripod into place, do not rely on the noise alone to indicate that it is secure: push it to check that no further movement is possible.

## Attach a camera to a mounting head

With a standard mounting head, the plate is screwed into one of the mounting points at the top or bottom of the camera. Attach the plate to the top or bottom of the camera according to the desired mounting orientation relative to the mounting head.



1. Note that the plate has arrows to indicate the alignment with the lens when you screw the plate into the camera and for when you lock it into the mounting head.
2. Use the arrows to position the plate correctly over the required mounting point and firmly screw and lock it into place.


- ✓ If you are mounting the camera on a rail, attach the plate to the camera on the ground before you bring the camera up to the rail.

### Tips


- ✓ To avoid slippage while mounting the camera, adjust the tilt and roll levers on the head to neutral orientations and ensure they are tight.
- ✓ Tighten the pan lever on the head and then thread the mounting head onto the stud.
- ✓ Ensure that the quick release lever is locked "open".
- ✓ When you lay out the cable, ensure that you have enough length to allow for any adjustments needed.



## Mount the camera




-  **Warning:** If using cherry-picker or scissor lift to install the cameras:
- Always follow the safety and compliance instructions for your apparatus.
  - Ensure you remain within 1 m of the camera and can gain sufficient height to prevent you from having to reach or lean.
  - If someone is required to hold the climbing equipment, ensure that they are not positioned directly under it.


1. To prepare the clamp, push down on the black button at the top of the mounting head and pull the lever until it snaps into place.
2. Insert the front of the camera first, before snapping it into the back.
3. Before releasing the camera, make sure the camera is locked in securely.
4. To secure the camera further, tighten the lever by hand to ensure no further movement is possible.


-  When carrying cameras at height, consider wearing gloves that offer improved grip.

To remove the camera, push down on the black button at the top of the mounting head and pull the lever until the camera becomes loose.

## Tips

-  Push the clamp and the levers to check that the clamp is still tightly secured to the rail and that the levers on the mounting head are also tight.
-  If you decide an adjustment to the clamp is needed, remove the camera from the mounting head, adjust the clamp, and re-secure the camera to the mounting head. Do not loosen the clamp while the camera is attached to the assembly.
-  If you move the cameras to adjust the field of view, ensure they are fully locked down again before continuing.

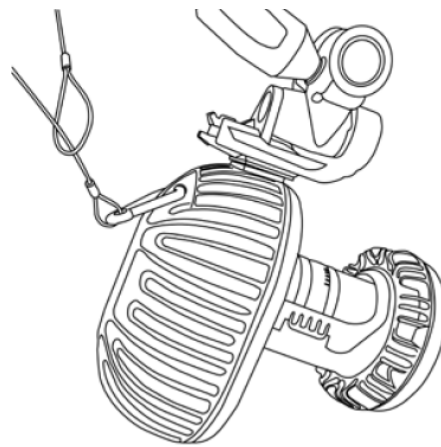
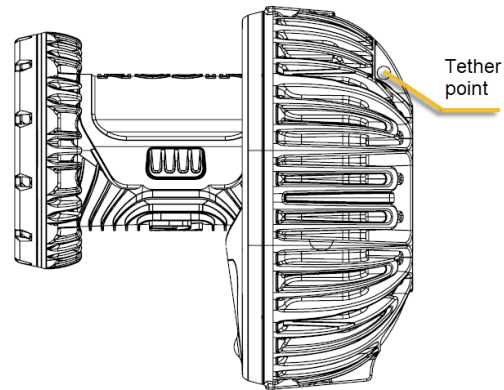
-  **Warning:** If the cameras are mounted where they may fall and injure people or damage equipment:
- To prevent injury, we recommend that anyone involved in the installation wears a hard hat.
  - Tether the cameras to their mounts with safety bonds (see [Tether a camera, page 10](#)).

-  **Warning:** When the cameras are in their final positions, tidy any slack cable to ensure it does not present a trip hazard and if the cameras are installed at height, ensure that no cables are dangling loose.

## Tether a camera

If the cameras are mounted where they may fall and injure people or damage equipment, tether the cameras to their mounts with safety bonds, ensuring that they are long enough to secure the cameras. To do this:

1. Loop the the safety chain around the rail and thread it through the tail loop to secure it in place.
2. Connect the safety chain carabiner through the hole (tether point) on the rear of the camera.



## Before connecting the cameras

Before you connect Valkyrie cameras to your Vicon system, note that when operating your Vicon Valkyrie system, you must observe these safety precautions:

- Do not look directly at the source when a Near Infrared (NIR) strobe unit (which may be present if Valkyrie cameras are part of a mixed system with other older Vicon cameras) or Infrared (IR) strobe unit is in operation and note the following caution and warning.



### Caution

Although it is theoretically possible for a strobe single fault condition to fully on to occur when an operator's eyes are within 100 mm of the Light Emitting Diodes for longer than 17 seconds, the likelihood of any such failure resulting in an emission of light that exceeds the Maximum Permissible Exposure defined by standard BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems) to infrared light is extremely unlikely in practice, due to the design of the product.



### Warning

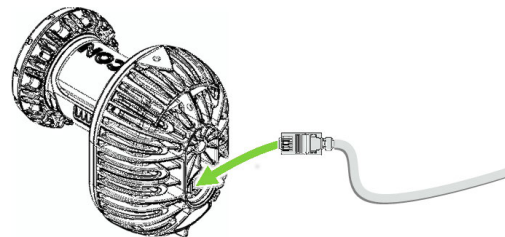
Under abnormal usage conditions, the Maximum Permissible Exposure defined by standard BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems) to infrared light may be exceeded if your eyes are within 100 mm of the Light Emitting Diodes for longer than 400 seconds.

## Connect the cameras

- 1 Ensure the Ethernet switch is connected to an appropriate power source.
- 2 For each camera:
  - Insert one end of the supplied network cable (RJ45) into the Ethernet port on the camera.
  - Connect the other end to the Ethernet switch.

- ✓ If you need to remove the IP65 cable cap that protects the camera's Ethernet port, follow the instructions in [Remove and replace IP65 cable cap](#), page 4.

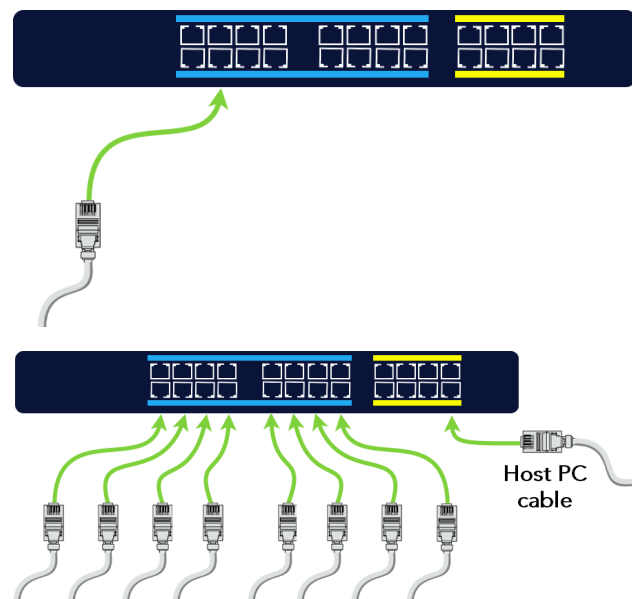
- ✓ To adjust the focus, aperture, or zoom, you must remove the IP65 lens cover. You may prefer to remove the cover before you mount the camera and replace it when you've finished adjusting the settings. For further tips, see [Valkyrie handling recommendations](#), page 3).



From the total number of sockets, remember:

- One socket is needed to connect to the host PC.
- To benefit fully from the power and range of Valkyrie cameras, connect each camera to a UPoE port on a UPoE switch (in the illustration, UPoE ports are indicated by a blue line).
- The UPoE switch can support up to eight Valkyrie cameras. Any spare ports can be connected to other components in your system, such as a Vicon Lock unit, etc. The uplink ports or any spare PoE+ ports can be connected to the PC (in the illustration, indicated by a yellow line).

To add more cameras, you can connect further Ethernet switches to the system (see the *Valkyrie Topology* video in the release installation folder).



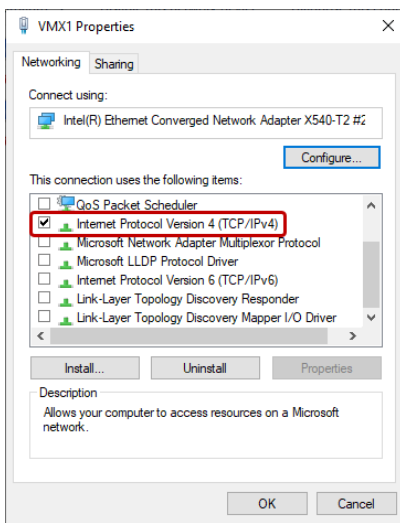
- 3 Turn on the Ethernet switch.



- ⚠ Although your Valkyrie cameras are IP65-rated, the other components of your Valkyrie system (switches, Locks, other cameras, etc) may not be, so ensure that these components are not exposed to unsuitable environmental conditions.

## Connect and configure the PC

- 1 With the supplied network cable (Cat6 or 6a RJ45), connect the Ethernet switch to the PC.
- 2 On the PC open **Windows Network Connections**, right-click the NIC to connect to the system and then click **Properties**. (To connect more than one card, right-click the first NIC.)
- 3 In the **Properties** dialog box, on the **Networking** tab, clear all the unwanted items, leaving only **Internet Protocol Version 4 (TCP/IPv4)** selected.

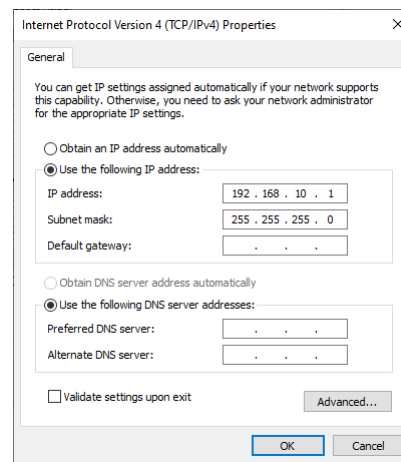


For detailed instructions on configuring your PC network card, see [Configuring network card settings](https://docs.vicon.com/display/Connect/Configuring+network+card+settings)<sup>2</sup>.

- 4 Click on this option to highlight it and then click **Properties**.

- 5 In the **Internet Protocol Properties** dialog box, on the **General** tab enter the following information:

- **IP address** box, enter **192.168.10.1**.
- **Subnet mask** box, enter **255.255.255.0**.
- **Default gateway** box, leave the box blank.



- 6 If you are using more than one NIC, enter the IP address **192.168.10.1** for the first NIC to which the system is connected, as described above, see the following *Link aggregation for multiple NICs* box for the remaining addresses.

- 7 Click **OK** to close the dialog box, and **OK** to close the **Properties** dialog box and save the settings.

### ✓ Link aggregation for multiple NICs

In very large systems, to use more cameras or data, you can use additional NICs in your PC to split camera data. To do this:

1. Set the additional IP addresses of your NICs to different addresses in the available range 192.168.10.2–9.
2. In your Vicon application software, in the **Properties** pane for each camera, set the **Destination IP Address** to the IP address of the NIC to which to send data.

<sup>2</sup> <https://docs.vicon.com/display/Connect/Configuring+network+card+settings>

## Install and license the Vicon application software

**1** Obtain the required software installer from Vicon.

The Vicon software installer enables optional installation of the License Server software for server-based licensing, and the dongle drivers for licenses that are locked to dongles.

**2** For detailed instructions on how to install your Vicon application software and use Vicon product licensing, see your Vicon software documentation (PDF or online help).

**3** If you are prompted to restart your PC, do so as soon as possible.

## Start the software

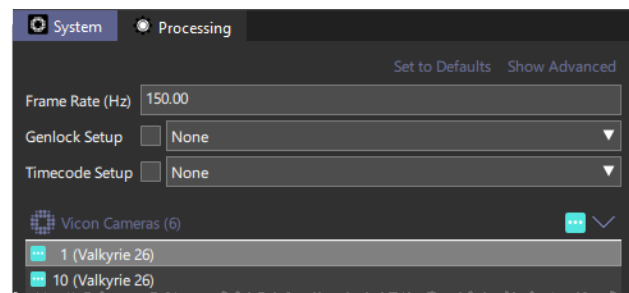
**1** On your Windows desktop, double-click the shortcut for the required Vicon software.



**2** If this is the first time you have used your Vicon application software on this PC, a dialog box may be displayed, enabling you to specify the license server.

**3** In the **System** panel, make sure all of the cameras in your system are listed.

**4** Ensure that at the top left of the screen the system is shown as live and connected.



## Position the cameras

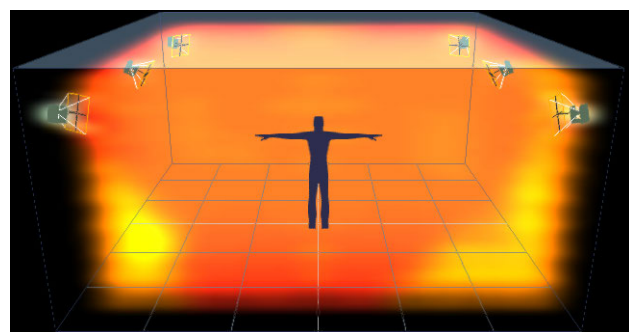
**1** In the **System** panel, select a camera.

**2** Change the view to **Camera** view.

**3** Aim the camera so that it points where required, usually the center of the capture volume.

**4** Repeat the process for each camera.

The heat map image (right) shows camera coverage of a capture volume.



- ✓ **Video Preview mode:** Valkyrie's Video Preview mode helps you position the cameras by displaying the volume in video mode. To use Video Preview mode, in the **System** panel, select the relevant camera, right-click, point to **Video Preview Mode** and then select the required option.

## Configure your Vicon Valkyrie system

### Adjust camera settings

- 1 Start your Vicon application software, ensure it is in Live mode and that a **Camera** view is displayed.
- 2 In the **System** panel, select one camera. Notice that the **Properties** for this camera are listed at the bottom of the pane.
- 3 Have someone wave the calibration wand in the capture volume and ensure that you can see markers moving in the view pane.
- 4 Note the **Grayscale Mode** property. The default setting is Auto, which tells the cameras to send to the Vicon software all the centroid data for grayscale blobs it can circle-fit. If any grayscale blobs cannot be circle-fitted, the grayscale data is sent to the Vicon software so it can try to circle-fit the blobs.
- 5 Look at the **Strobe Intensity** setting. With a value of 1, the cameras send as much light as possible into the volume. Zoom in to a marker by right-clicking and dragging the mouse. Notice how the pixels change as you lower the light (to view images from a grayscale blob, **Grayscale Mode** must be set to All).
- 6 Notice the **Threshold** property. It tells the camera how bright a pixel must be to be accepted by the camera. Zoom in to a marker and notice how the pixels change as you adjust the property.
- 7 Adjust the **Strobe** and **Threshold** settings so that you see only the 2D circular-shaped markers in your volume. Adjust the **Strobe Intensity** setting only as low and the **Threshold** only as high as needed.

### Set camera focus and aperture

- 1 Place three markers in the middle and on the far side of the capture volume.
- 2 Holding the camera body, unclip the lens cover from the lens.
- 3 Leaving the focus on infinity ( $\infty$ ), close the aperture to as high an f-stop value as possible, so that you can still see the markers at the furthest distance required.

- ✓ In general, it's better to run with a low Threshold setting and more closed aperture, than a high Threshold and open aperture. (See **Threshold** in [Adjust camera settings, page 14.](#))

- 4 For each camera, turn the aperture ring (the ring with the f-stops) until the aperture is fully open. Later you will turn the ring back, increasing the f-stop number and closing the aperture.

Focus and aperture rings on a Vicon Valkyrie VKX





**5** In the **System** panel, select all the cameras (Shift+click). In the **Properties** section at the bottom of the window, change **Grayscale Mode** to All.

**6** In the **System** panel, select a camera. For each marker:

- a. In the view pane, zoom in to the center of the marker.

Valkyrie cameras are supplied pre-focused for typical motion capture use, so in most situations, no focusing is necessary. The following step (b) is applicable only if you need to re-focus the camera, otherwise, go straight to step c.

- b. If required, turn the camera focus ring (see above illustration) until the 2D image of the marker in the view pane is clear and sharp. As you rotate the focus ring, note that the marker images get smaller and then begin to get larger again. Good focus is when the marker is at its smallest.
- c. Note that, with the aperture fully open, the markers appear fully saturated, with very little grayscale gradation and some merging, as in the following image.

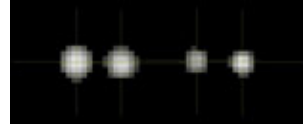


Adjust the aperture ring to change the amount of light that hits the image sensor. Turn the aperture ring to close the aperture and obtain good, clear images of markers even when they are close together.

If you turn the aperture ring too far, until the aperture is almost closed, the markers appear very small, lack any bright grayscale pixels and the circle-fitting is poor, as shown below.



Adjust the aperture ring so that the markers are not too small, and the center is just off-white (not fully saturated) when viewed from the middle of the volume.



**7** For each camera, repeat Step 6.

**8** When you are happy with the focus and aperture, to prevent the rings from moving, tighten the locking screws using your fingers and then replace the lens cover.

**Caution:** If the locking screws are not sufficiently tightened, the weight of the lens can cause the rings to move. Ensure the locking screws are finger tight, but to avoid damaging the screws or the rings, do not over-tighten the locking screws and do not use an Allen key.

**9** In your Vicon application software, select all of the cameras and change the **Grayscale Mode** property back to Auto.

For information on the next steps, such as masking and calibrating the cameras, see the documentation for your Vicon application software.

## Vicon Valkyrie troubleshooting

If something is not quite right, try these quick tips to get things going again.

### Set up your Valkyrie system

I am missing some equipment

or

Some equipment appears damaged from shipment.

- Contact Vicon Support [support@vicon.com](mailto:support@vicon.com)<sup>3</sup>

### Connecting

My hardware isn't connecting to the computer.

- Confirm that the IP address settings are correct following the instructions in [Connect and configure the PC, page 12](#).
- Check the network card settings, including Jumbo Packets (see [Configuring network card settings](#)<sup>4</sup>).
- Disable any firewall on the network card.
- Confirm that the Ethernet cable is firmly seated.
- Ensure you are an administrator on the computer.

### Camera hardware

I don't see an image from the camera.

- Confirm that you've removed the lens cap.
- Ensure that the aperture is not fully closed.
- Confirm that the **Strobe Intensity** is high (best on full at 1) and that the **Threshold** is not too high (a good default is 0.2).

When I tap a calibrated camera to select it, the camera indicates that it has been bumped.

- To change the sensitivity of the camera to taps, in the camera's **Properties** pane, go to the **Accelerometer** section and lower the **Bump Sensitivity** setting.

### Calibrating cameras

After calibrating, image errors are very high.

- Ensure that the camera aim and focus are correct, the camera properties are set appropriately, and that you covered the whole volume during your wand wave, then repeat the calibration.
- Ensure **Active Wand** is selected in the **Camera Calibration** panel.

If you need more information than that supplied in the documentation or on the [Vicon Support web pages](#)<sup>5</sup>, please contact Vicon:

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<sup>3</sup> <mailto:support@vicon.com>

<sup>4</sup> <https://docs.vicon.com/display/Connect/Configuring+network+card+settings>

<sup>5</sup> <https://www.vicon.com/support>