

# **MOD.01 User Manual**

# Federal Communication Commission

## Interference Statement

### FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio technician for help.

### FCC Caution

This equipment must be installed and operated in accordance with provided instructions and a minimum 20 cm spacing must be provided between computer mounted antenna and person's body (excluding extremities of hands, wrist and feet) during wireless modes of operation.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

**Federal Communication Commission (FCC) Radiation Exposure Statement**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The equipment version marketed in US is restricted to usage of the channels 1-11 only.

## Industry Canada Statements

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with the safety requirements for RF exposure in accordance with RSS-102 §2.5.2. This equipment must be installed and operated in accordance with the provided instructions and a minimum 20 cm spacing must be provided between the antenna and any person's body during wireless modes of operation.

Cet appareil est conforme avec Industrie Canada exempt de licence Rss standard(s). Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne peut causer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris des interférences qui peuvent provoquer un fonctionnement indésirable du périphérique.

Ce dispositif est conforme à la norme de sécurité en matière d'exposition RF conformément à la RSS-102 §2.5.2. Ce dispositif doit être installé et utilisé conformément aux instructions fournies et à 20 cm espace minimal doit être prévu entre l'antenne et le corps de toute personne pendant les modes sans fil de fonctionnement.

- (i) The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
  - (ii) Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices
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- (I) Le dispositif pour fonctionner dans la bande 5150-5250 MHz est uniquement pour une utilisation en intérieur afin de réduire les risques d'interférences nuisibles à la co-canal des systèmes mobiles par satellite;
  - (II) Les utilisateurs doivent également être informés que les radars à haute puissance sont désignés comme utilisateurs principaux (c.-à-utilisateurs prioritaires) des bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient provoquer des interférences et / ou endommager LE-LAN dispositifs

# R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

## **Safety**

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacture must therefore be allowed at all times to ensure the safe use of the equipment.

## **EU Countries Intended for Use**

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

## **EU Countries Not intended for use**

None.

# Introduction

## About Modcam

Intelligent and open – the beginning of a new era in computer vision. Over the years, the hyper-growth in the mobile industry has pushed down cost of components immensely and opened up for a great developer community. At Modcam, we have used this opportunity and applied logics from the smartphone industry to develop a new solution for computer vision.

Modcam provides an outstanding platform for intelligent computer vision applications. We have created a smart piece of hardware and an open software architecture to breed new exciting opportunities within computer vision. The platform enables videos and pixels to be translated into information, before being distributed to a network. Our platform is tailored for video content analytics applications through our unique knowledge about image processing and the interaction between software, hardware, and camera sensor. Modcam gives you the ability to see, understand and react.

## About the MOD.01

The MOD.01 is a powerful quad core ARMv7 platform with a 5 megapixel camera sensor, GPS, accelerometer, compass, microphone and enough storage and memory to run advanced computer vision applications without pause.

It is physically built and adapted to be as versatile as possible with regards to mounting needs and environmental conditions and packaged in a sleek and non-intrusive design. It comes with full WiFi and Bluetooth 4.0 stacks and there are options for Ethernet adapters with PoE support for larger installation.

While the MOD.01 is mainly designed to be continuously powered via its micro-usb connector, it comes with a 800mAh battery inside that will both allow it to retain operation during power outages and last for up to a full day where external power supply is limited.

## This document

This document describes basic properties, usage and handling of the MOD.01 hardware product, including setup experience, installation and mounting options.

# General product handling

## Unpacking and general considerations

Included with your MOD.01 device should be a three metres, charging-only, Micro-b to Type-A USB cable, a 1A USB Type-A power adapter for your region and a standard two-part MOD.01 ceiling mount intended for top-down coverage<sup>1</sup>.

## Boot, shutdown and LED patterns

The MOD.01 device will automatically boot whenever it receives power through its micro-b USB contact. This means that as a safe-guard against power outages, if power is inserted, it will automatically boot even when manual shutdown has been performed.

Upon boot, the device will go through a series of patterns with the four LEDs situated around the camera lens of the unit.

## Shutdown

To turn off the device, remove any power source and press the button for at least 6 seconds. During this time, the LEDs will show a countdown pattern (after a couple of seconds). The countdown ends with a four LED white flash, indicating that the shutdown is complete.

## Standard LED behaviour

1. Blue lower right/left light - Pre-boot phase.
2. Blue lights, spinning - Booting.
3. Four orange lights, flashing - Not connected to network, scanning for QR code.
4. Four green lights, flashing - QR code scanned.
5. Orange lights, spinning - Connecting to network.
6. Orange lights, alternately flashing left/right - Network connection failed.
7. Yellow lights, pulsating - Connected, installation not finished, video stream possible.
8. White lights, slowly pulsating - Connected, installed and ready.

**Note:** Spinning red lights indicate an ongoing over-the-air (OTA) upgrade. Never shut down the device during this process!

## Configuration

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<sup>1</sup> The actual contents of your package may vary depending of OEM-packaging and point of resale.

Once your device has completed booting it will start flashing orange with all four LEDs, indicating that it is ready to read a QR code for configuration.

In a browser, navigate to <https://setup.modcam.com> and follow the instructions!

## Upgrades

The device upgrades itself over-the-air whenever new software is ready to be deployed to the device. An automatic update check is performed immediately after acquiring a network connection and then once every 24 hours. The timeframe for the update check is by default between 3 and 4 in the morning, local time.

**Note:** Do not shut off the device once it has started upgrading the system, indicated by spinning red LEDs.

## Installation

When the device is ceiling-mounted you can calculate the approximate floor coverage area  $A$  for height  $H$  with the formula:

$$A = 1.78H^2$$

If the sensor has the optional wide angle lens attached, the formula to use is

$$A = 10.37H^2$$

This means that for a ceiling height of 4 metres, the approximate floor coverage is  $\sim 28\text{m}^2$ , or  $\sim 166\text{m}^2$  with the wide angle lens.

## Applications

For applications running on the MOD.01, please refer to the application-specific documentation.

# Specifications

## Application processor

MOD.01 is built on a Broadcom chipset - BCM23550, compliant with ARM TrustZone® and GlobalPlatform for system-level security.

- Quad 1GHz A7 CPU with ARM® NEON™ technology
- High-performance VideoCore IV GPU
- Integrated image signal processor (ISP) with support up to 12 megapixels
- High quality H.264 full HD (1080p30) camcorder and video playback
- Power management techniques that increase efficiency and optimize performance based on workload demands

## Memory subsystem

MOD.01 holds memory in package based on Samsung's MCP (Multi Chip Package) technology that allows integration of multiple memory chips of different types, such as NAND flash, eMMC and mobile DRAM, in a single package. MCP-based memory enables the rest of the application to view the memory subsystem as a single, unified "block", letting the memory subsection offer the highest levels of performance for the device.

- Density: eMMC(4GB)+LPDDR2(1GB)
- Max speed: 1066 Mbps (LPDDR2)

## Sensor subsystem

### Camera

MOD.01 is using a 5 megapixel camera with fixed focus.

- Resolution: 2592 x 1944 pixels – 5.0 MP
- 1/4" CMOS Sensor (Omnivision OV5648)
- Lens type – fixed focus (distance 60cm)
- View Angle:  $87.9 \pm 3^\circ$
- Output format: 8-/10 bit RGB RAW output
- Max S/N ratio: 34dB
- Dynamic Range: 67dB @8x gain
- Transfer rate:
  - QSXGA (2592x1944) @15fps
  - 1080p @30fps

- 720p @60fps
- VGA @90fps
- Sensitivity: 600mV/Lux-sec
- Rolling shutter

## Accelerometer/Gyro

MOD.01 is using a Bosch BMI055 ultra-small, 6 axis inertial sensor with very low-noise measurement of angular rates and accelerations in 3 perpendicular axes and thus senses tilt, motion, shock and vibration.

- digital, triaxial 12bit acceleration sensor
- digital, triaxial 16bit,  $\pm 2000^\circ/\text{s}$  gyroscope.

## eCompass

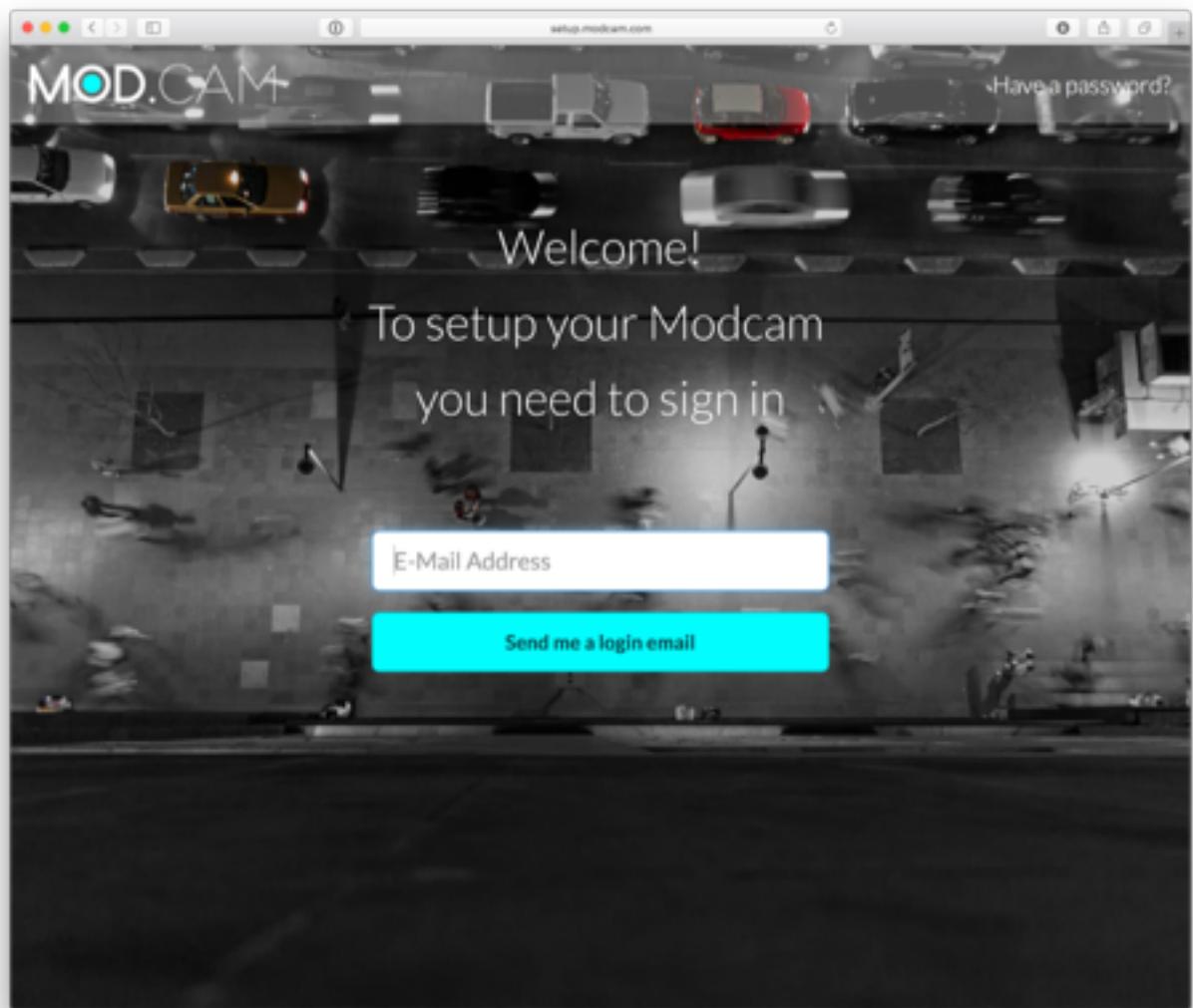
MOD.01 is using a Bosch BMM150 standalone geomagnetic sensor for consumer market applications. It allows programmable and flexible measurements of the magnetic field in three perpendicular axes with ultra-low voltage operation.

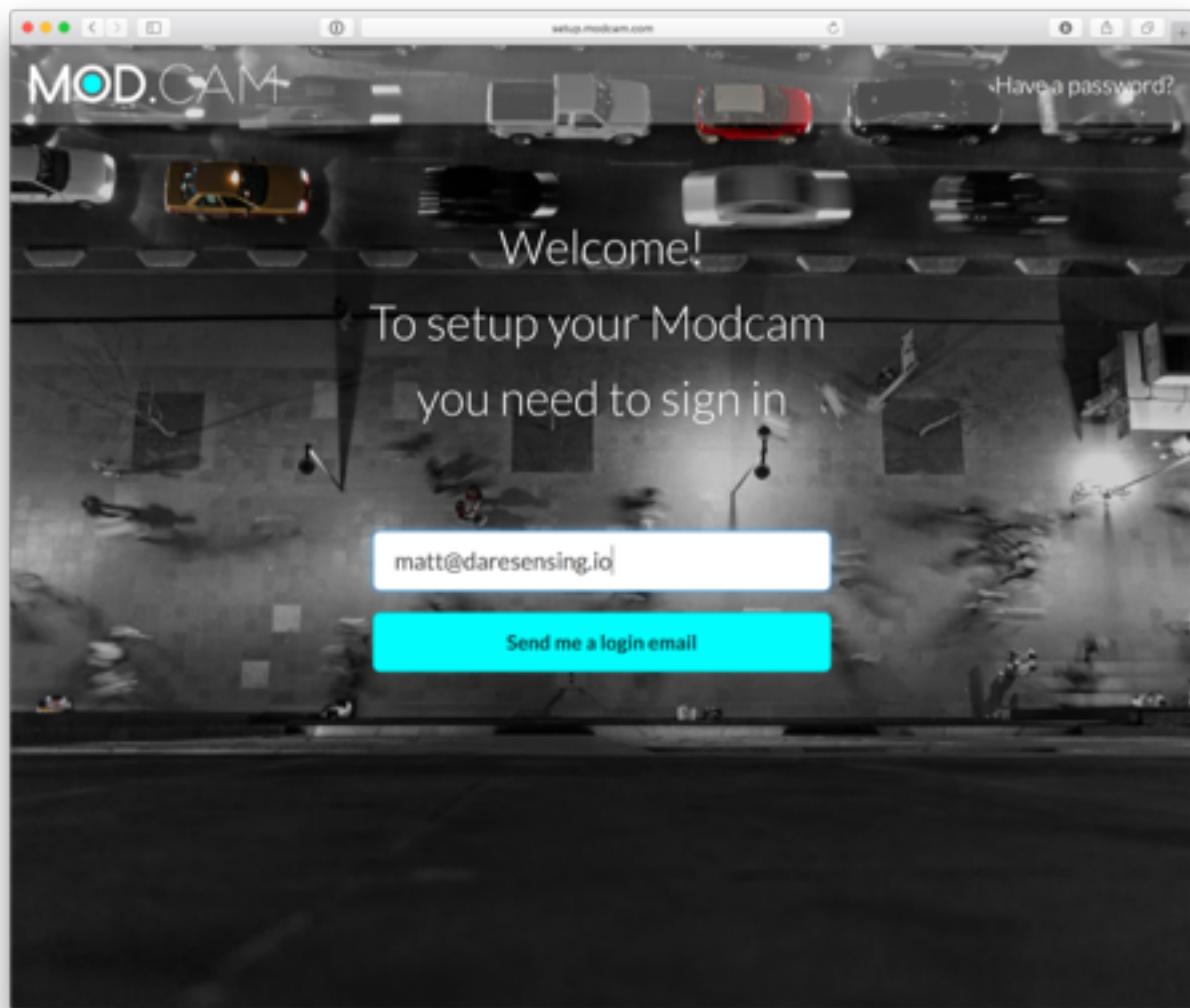
## Microphone

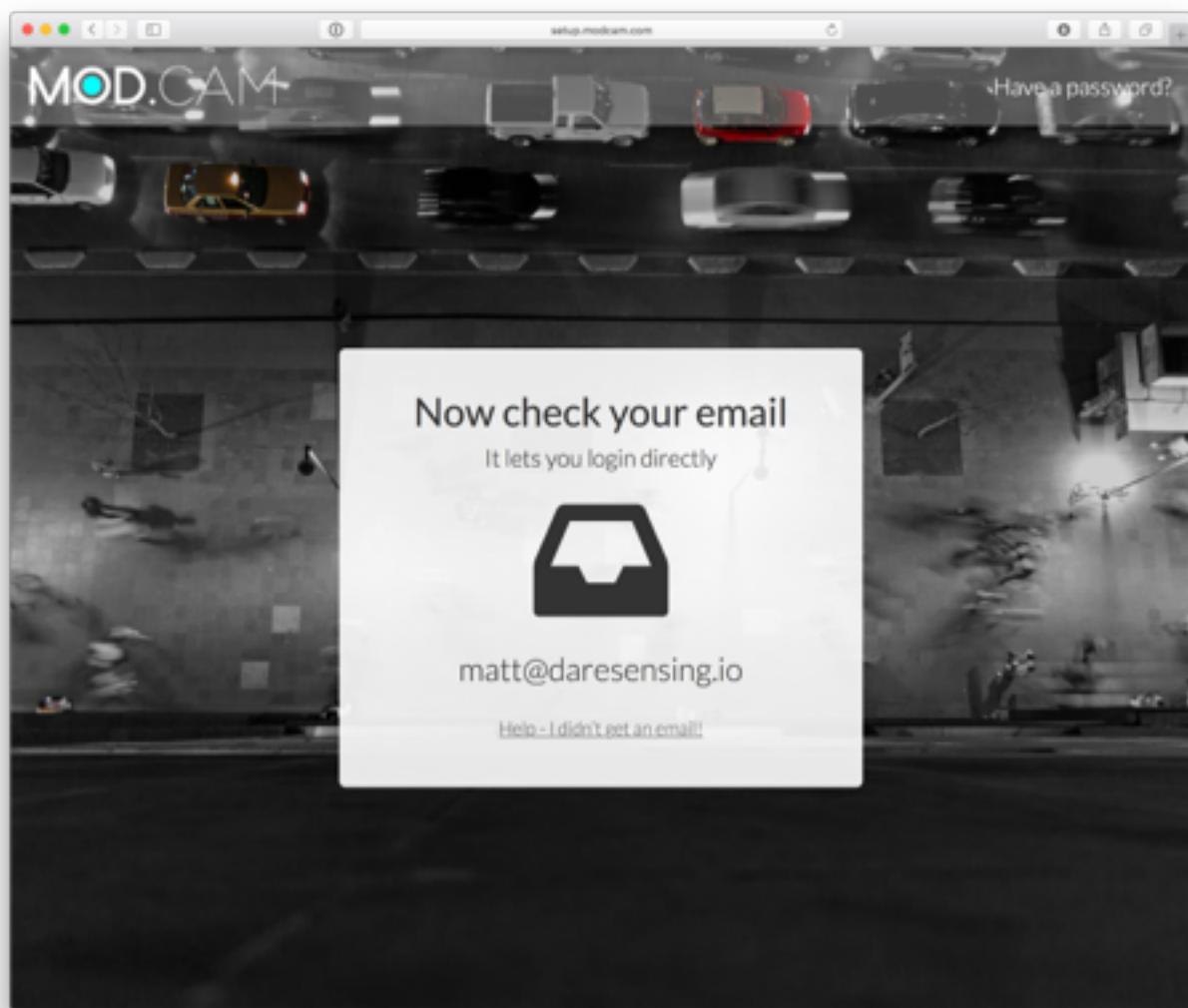
MOD.01 is using an omnidirectional, high sensitivity - "Ultra-Mini" SiSonic™ Microphone for sensing noise in the surrounding environment.

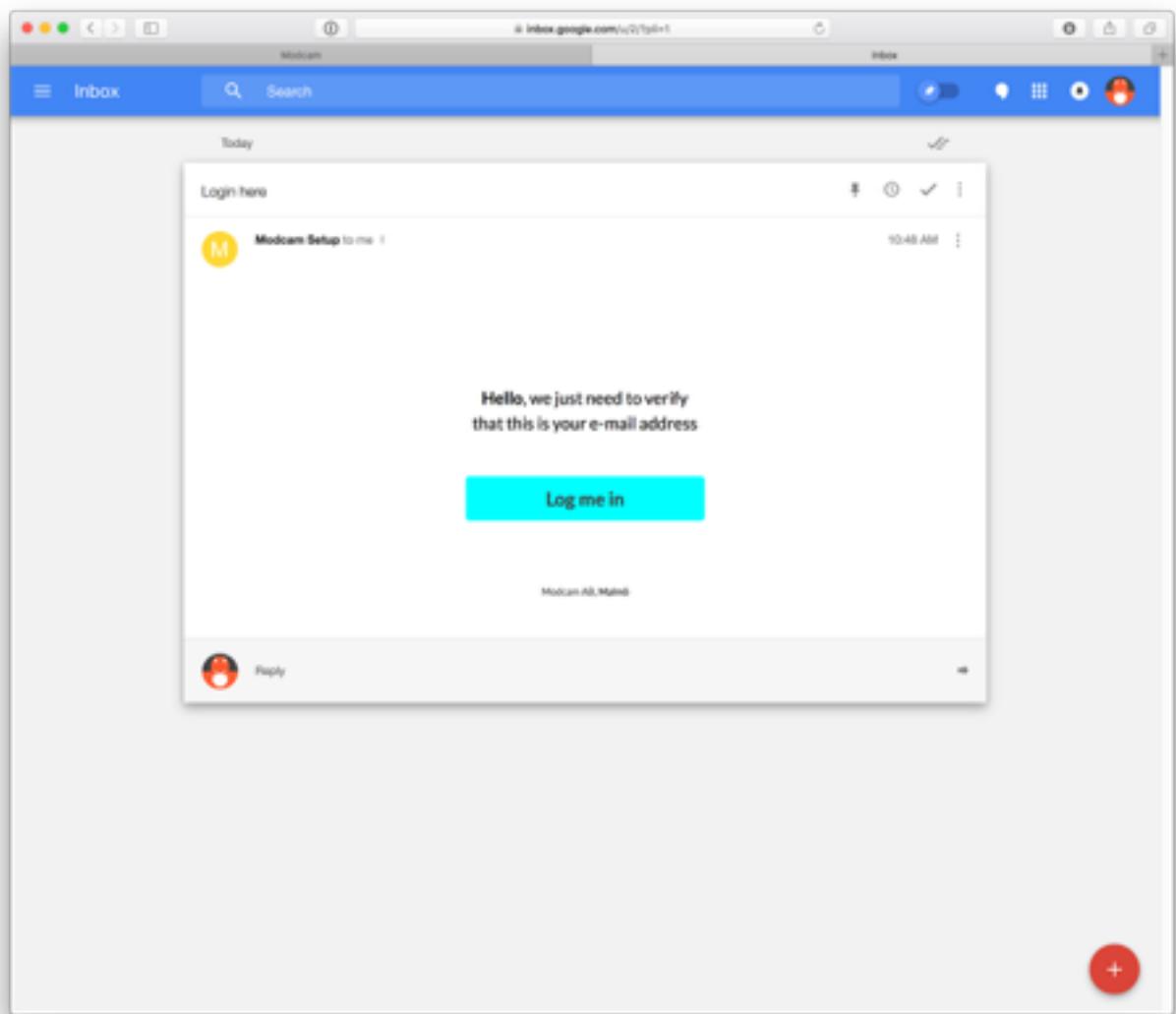
## Further questions and support

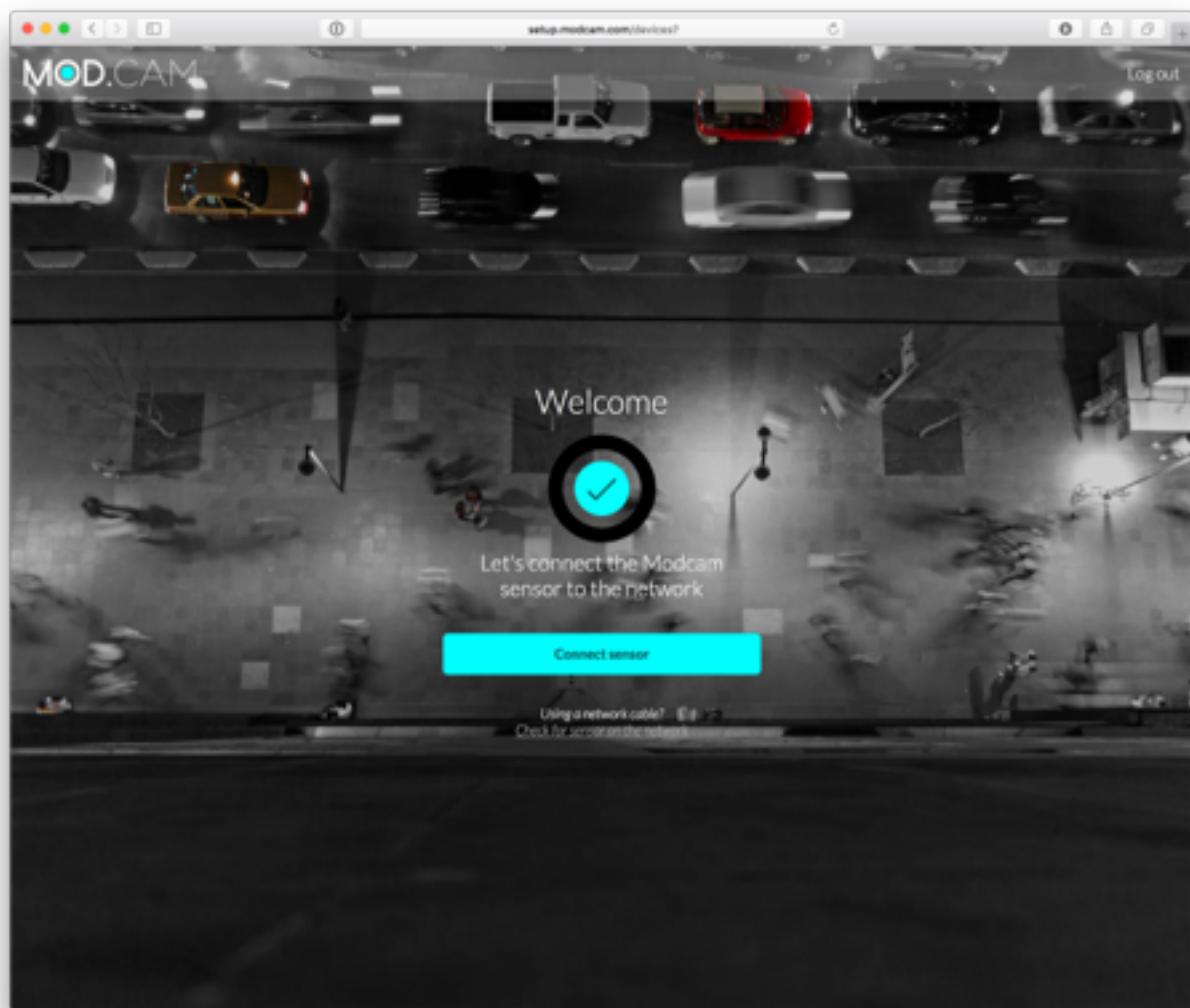
For further questions and support, please contact Modcam AB directly.  
[contact@modcam.com](mailto:contact@modcam.com)

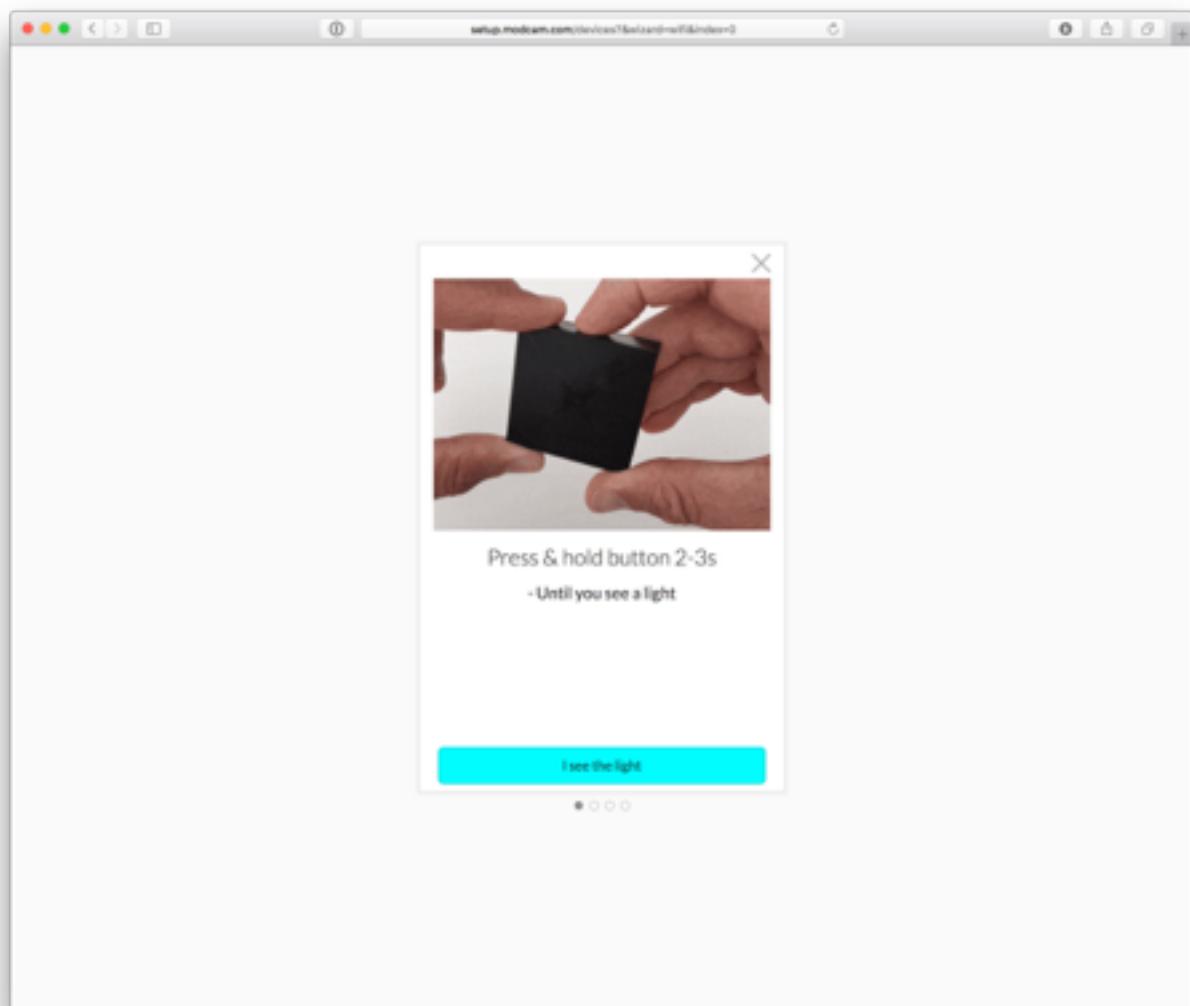


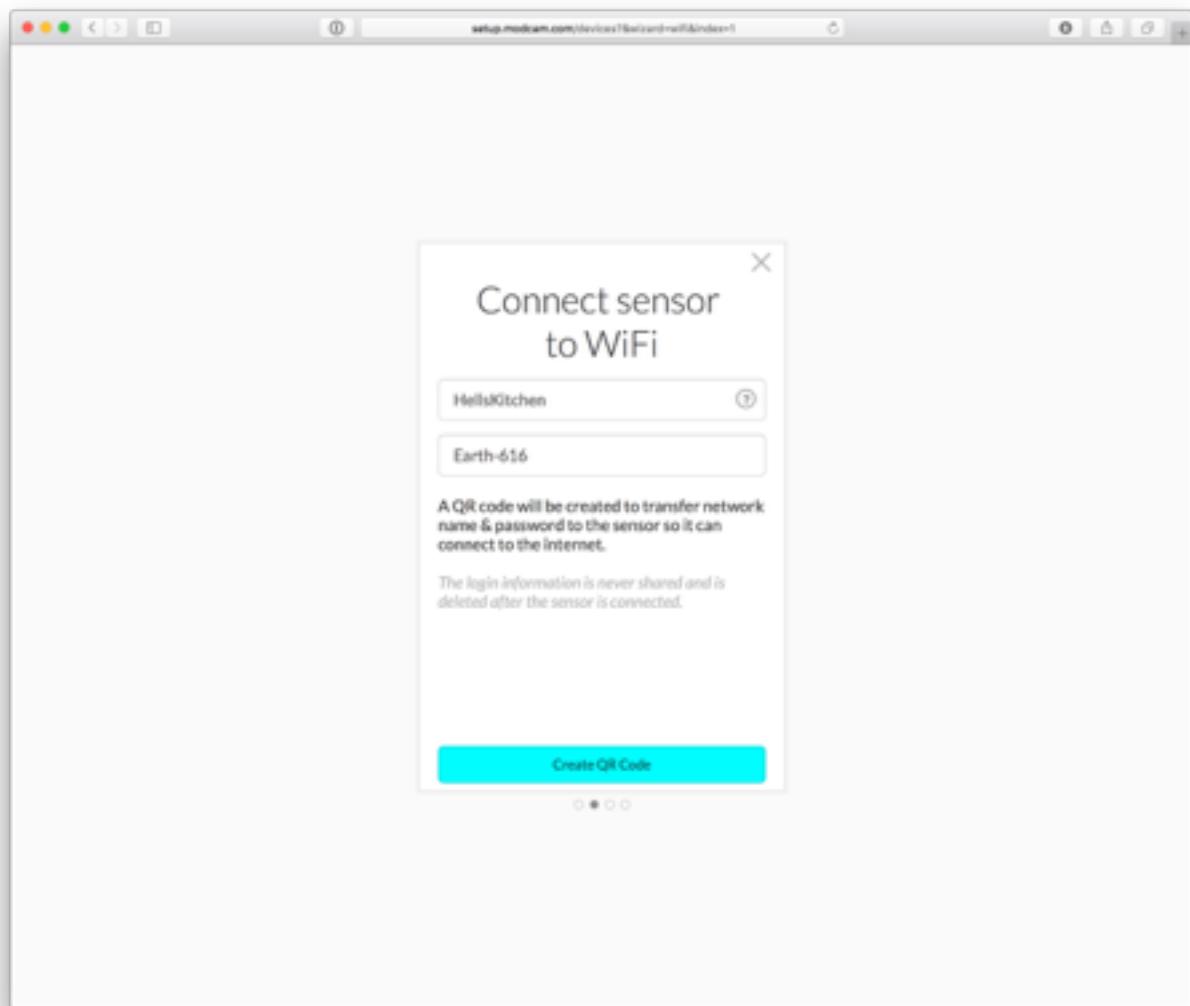




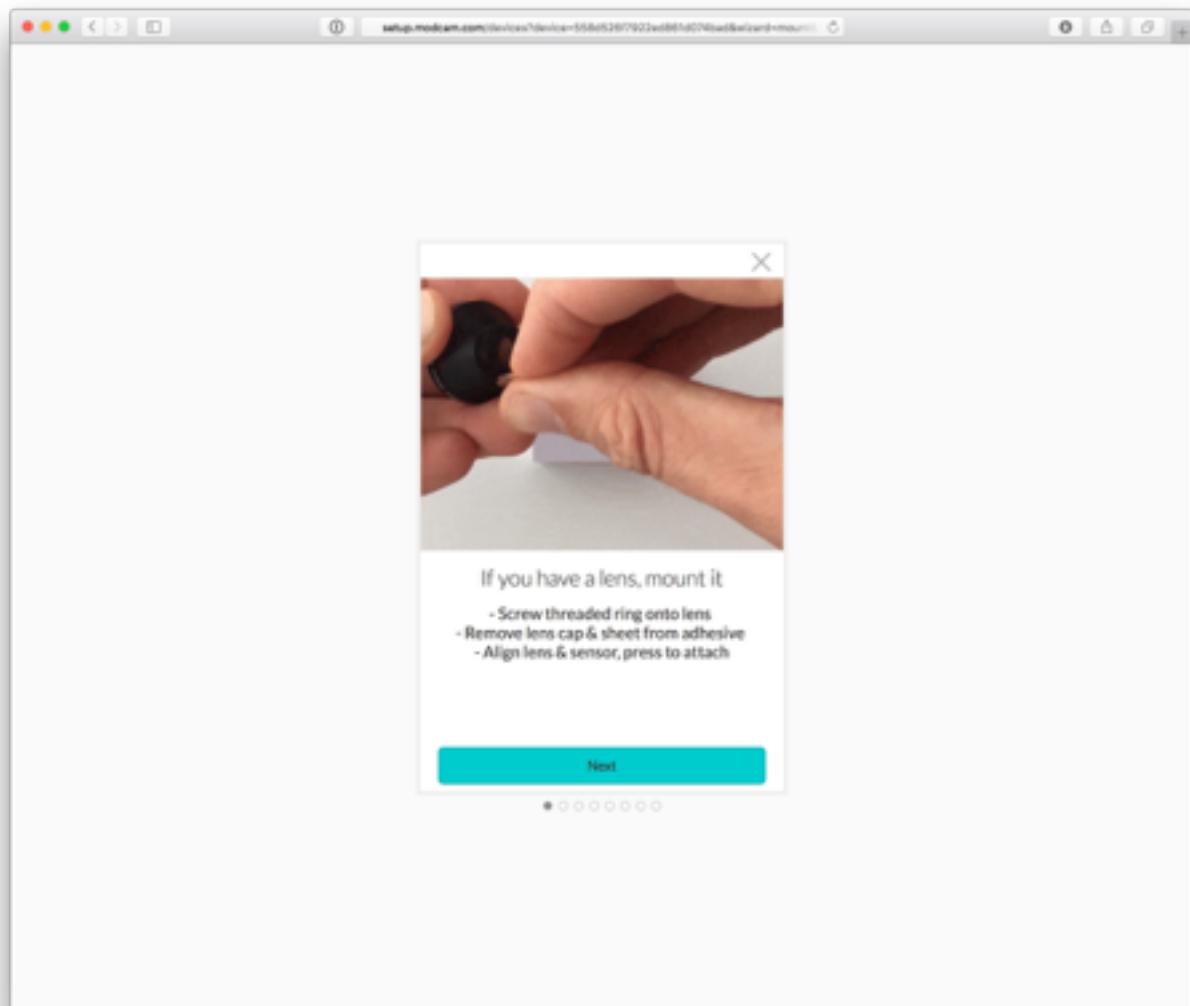








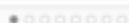


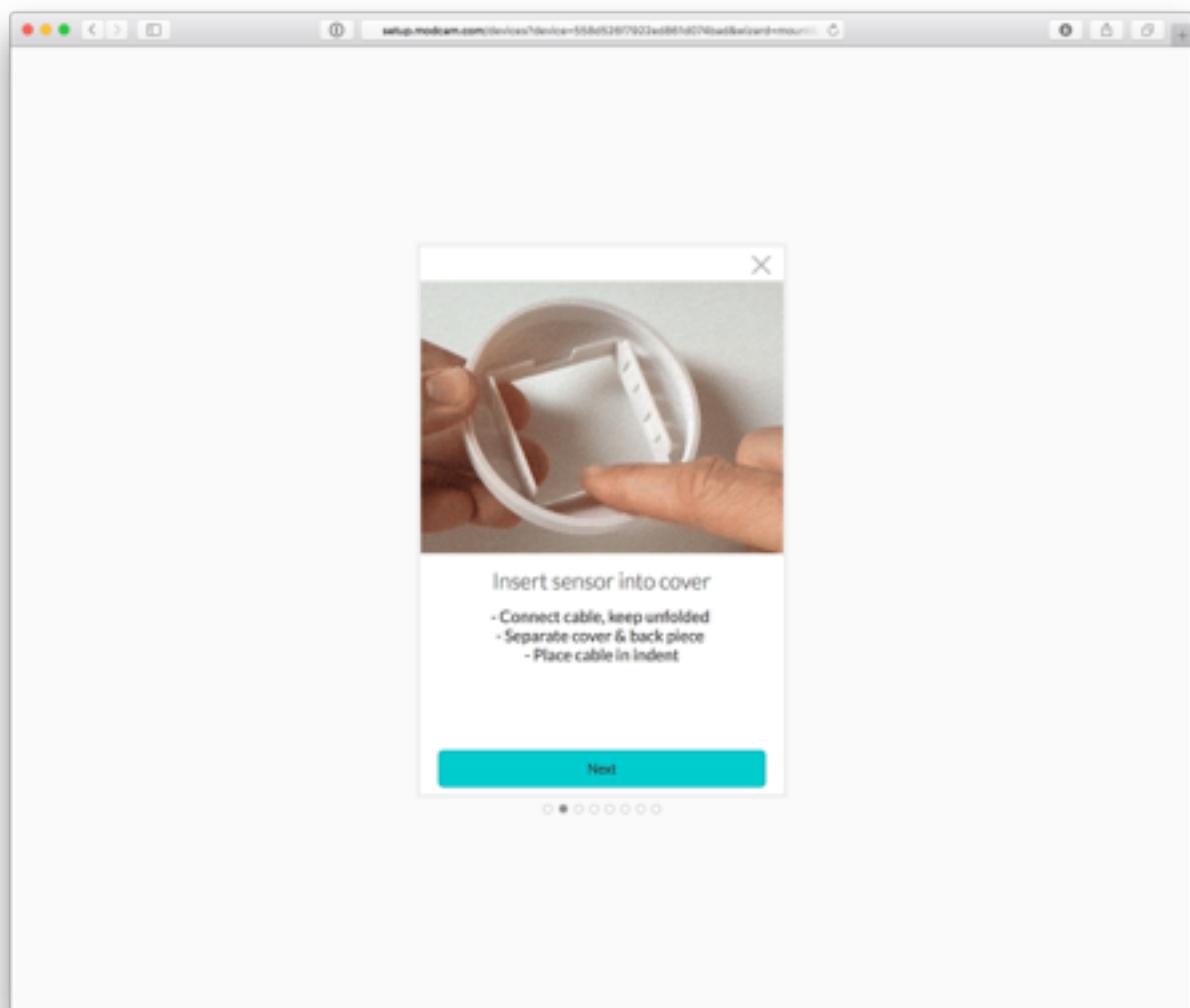


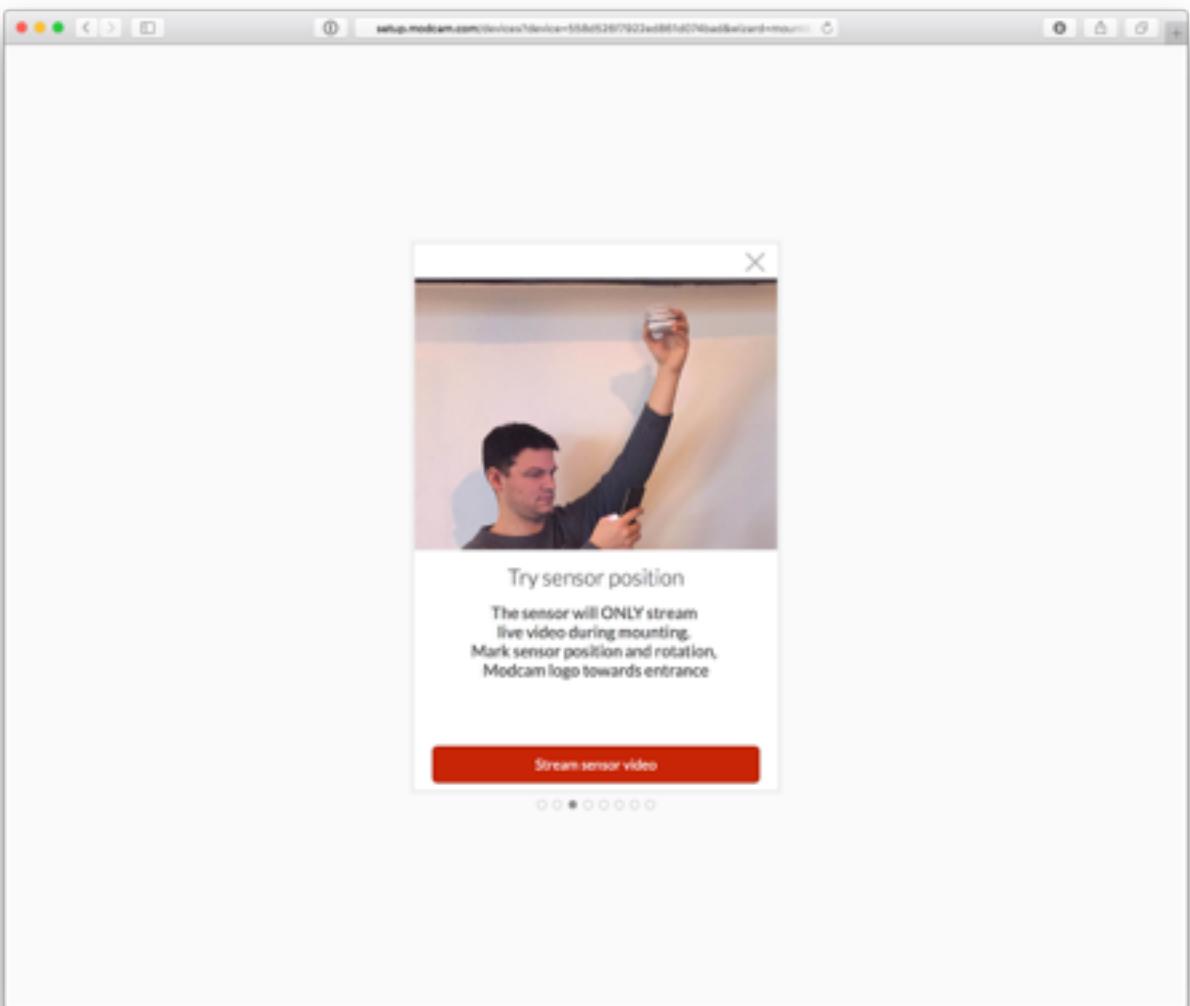
If you have a lens, mount it

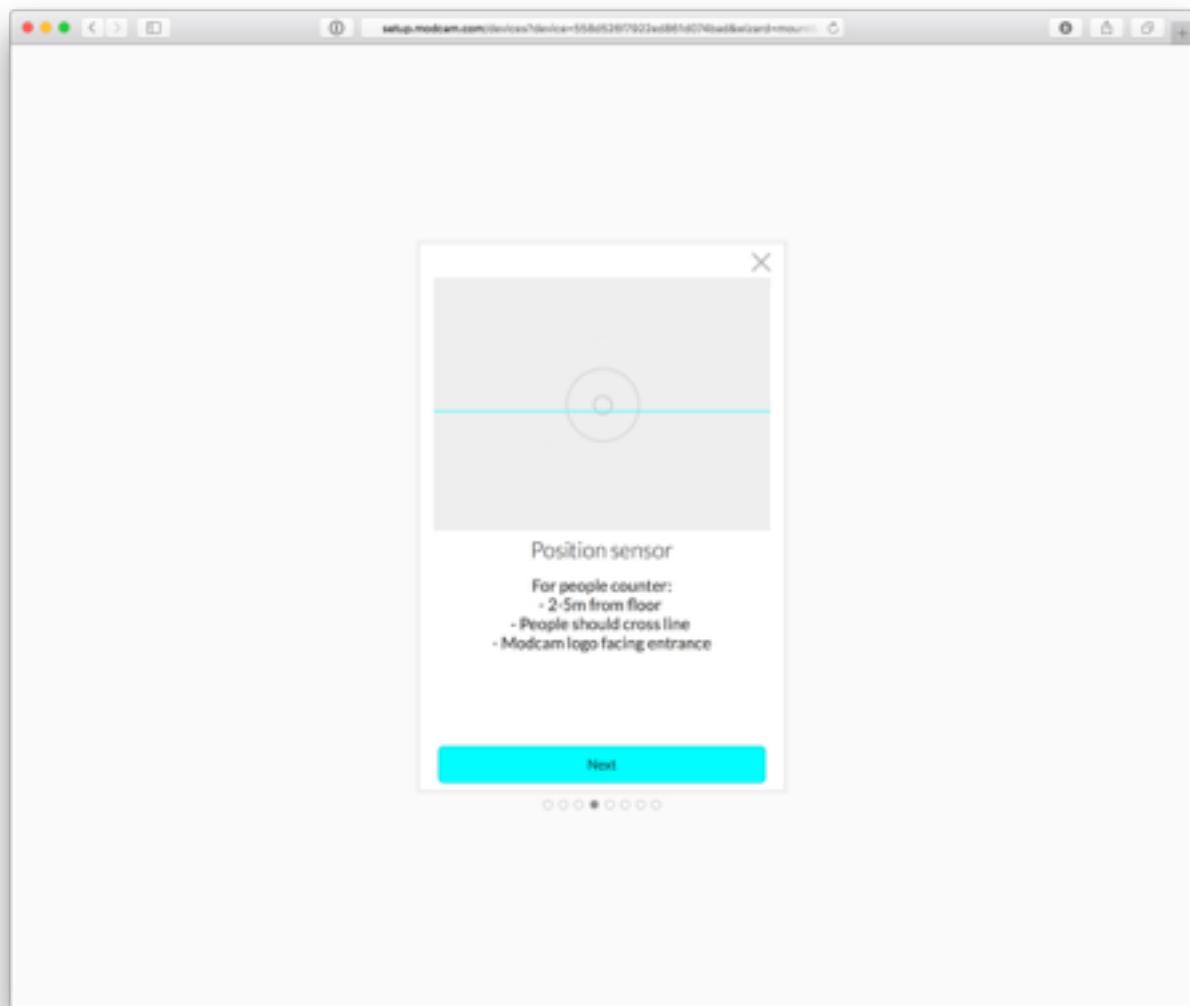
- Screw threaded ring onto lens
- Remove lens cap & sheet from adhesive
- Align lens & sensor, press to attach

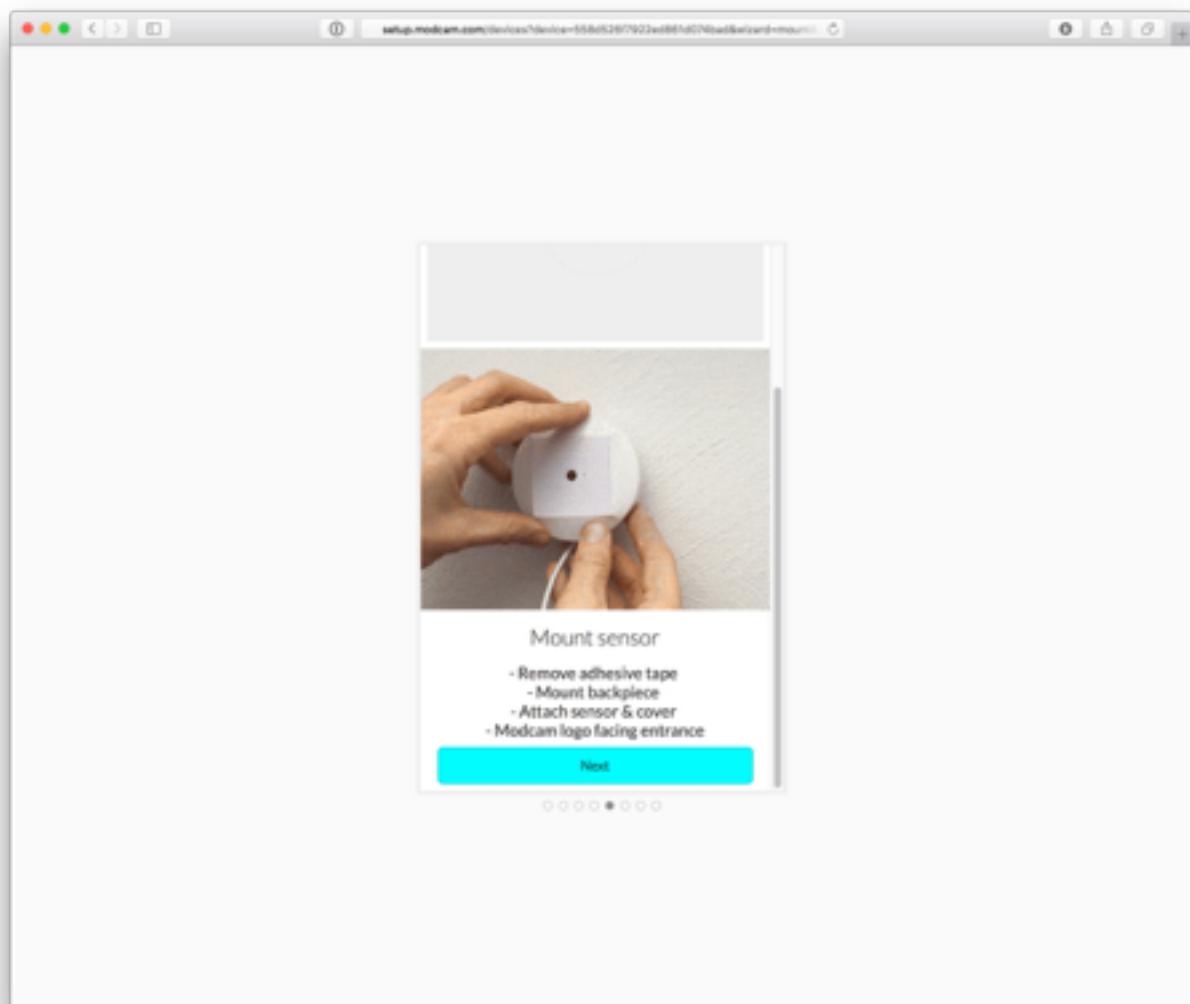
Next

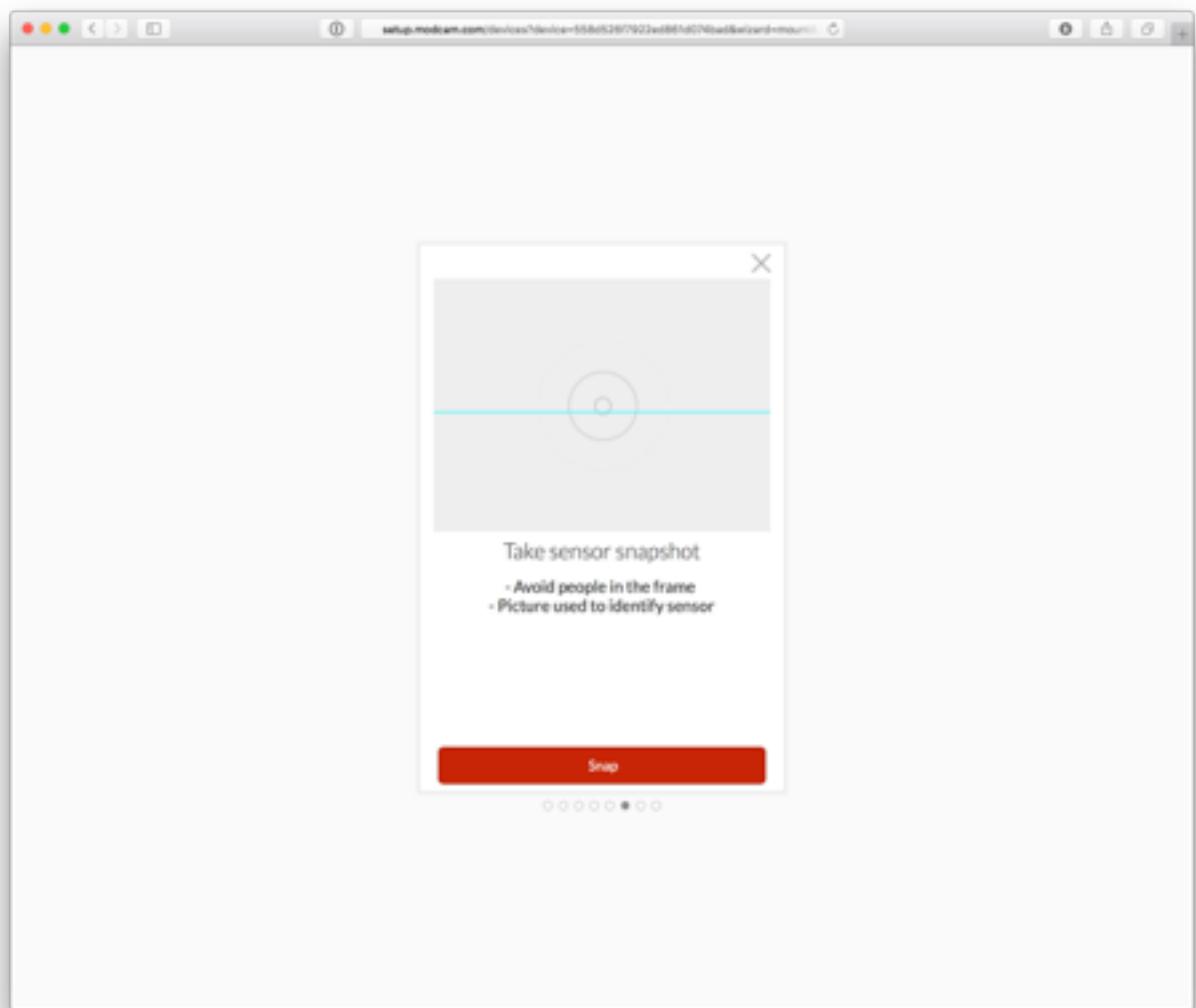










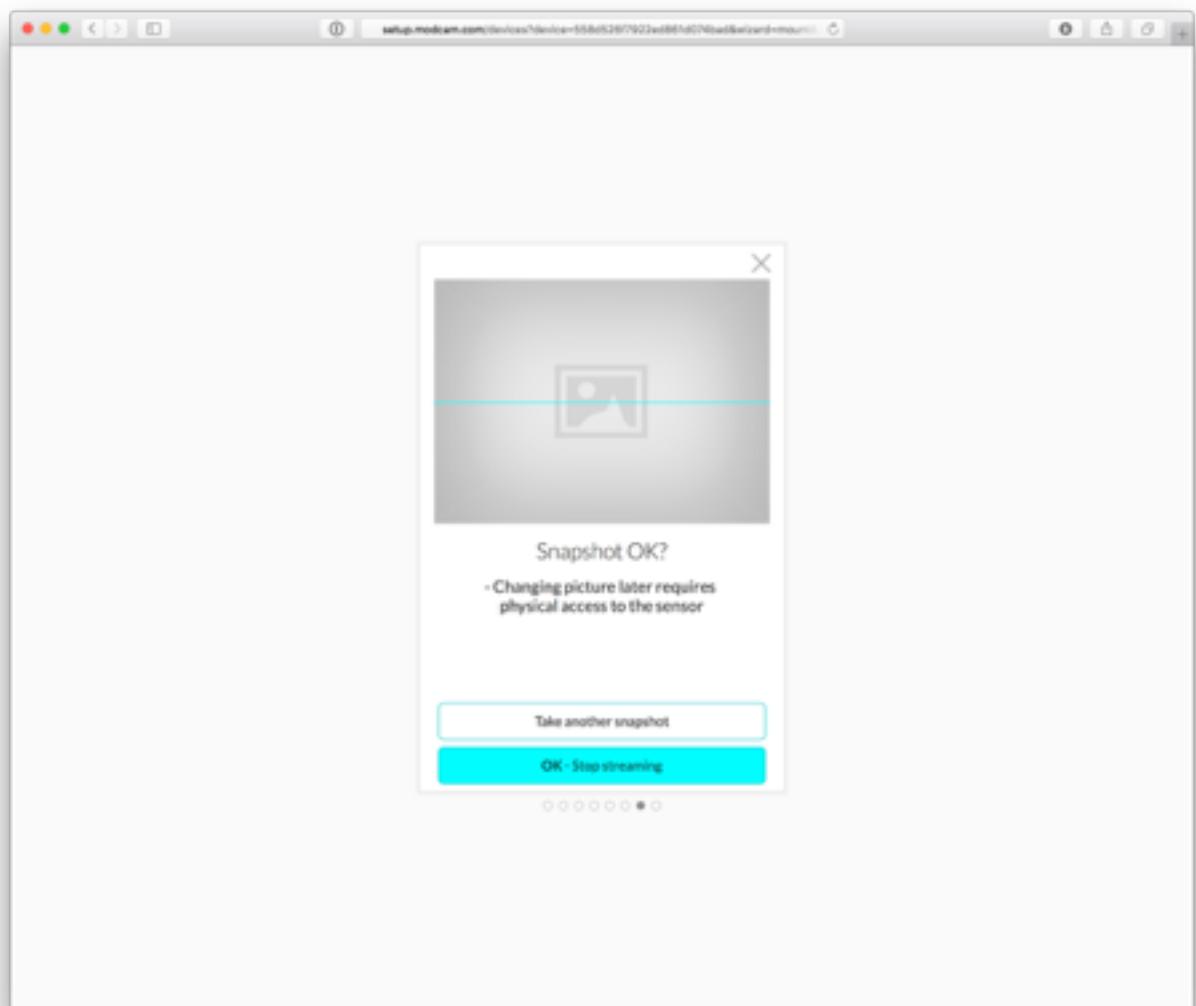


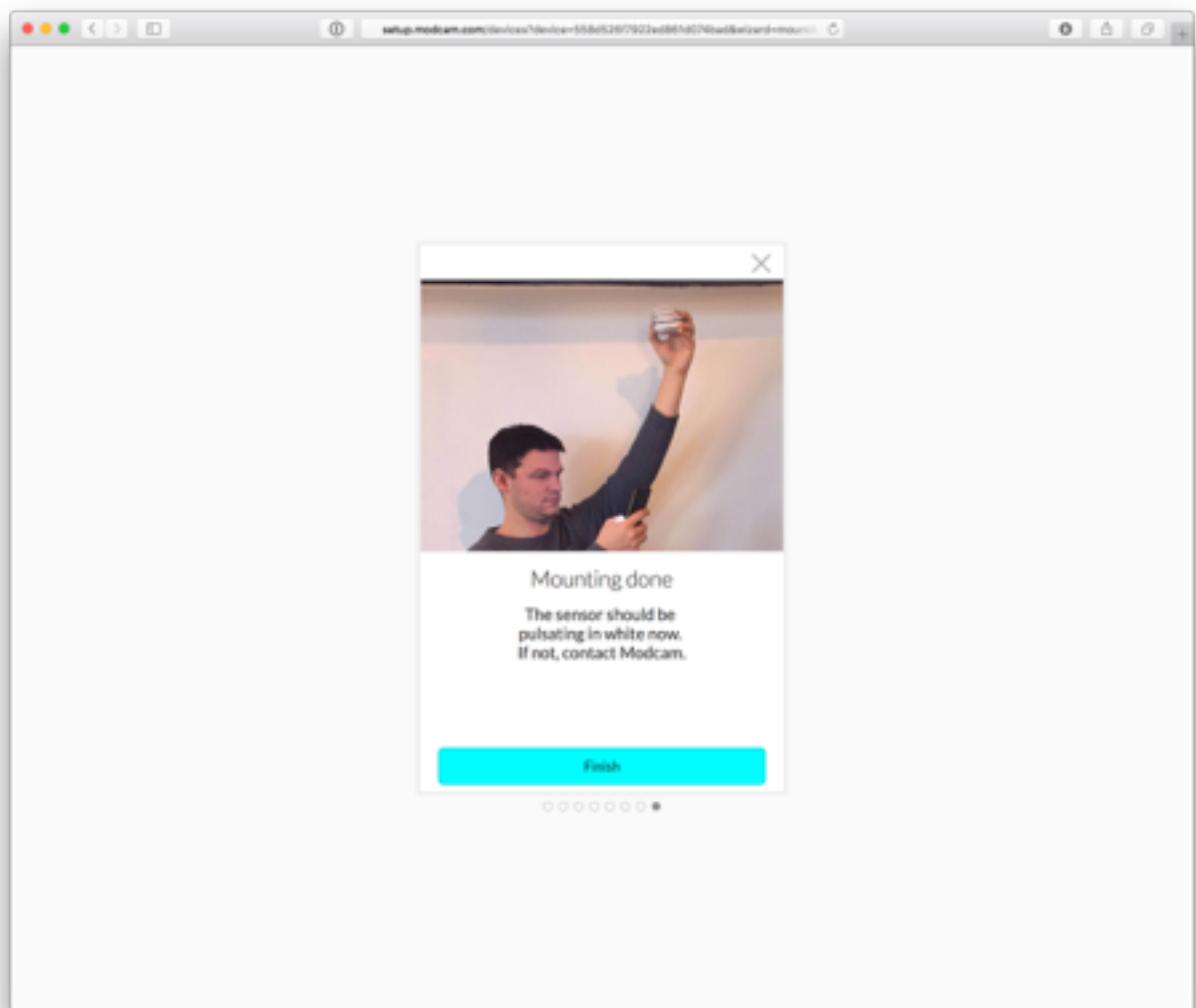
Take sensor snapshot

- Avoid people in the frame
- Picture used to identify sensor

Snap







setup.modcam.com/devices/device=558d952bf7912ed994bd74bad

You're using E-mail login. SETUP PASSWORD

## Sensors

+ Sensors

010019|3 05 00 -35

(N/A)

Battery Signal strength Setup Picture

0% 0dB

Mount style Lens

N/A N/A

Last heartbeat

none

Serial #

N/A

Logout

User Login:  
Please login at : dashboard.modcam.com



### User Interface and People count

Depending on credentials and applications the user have bought the UI is looking as below – the user has the possibility to watch, compare, extract data for multiple sensors

