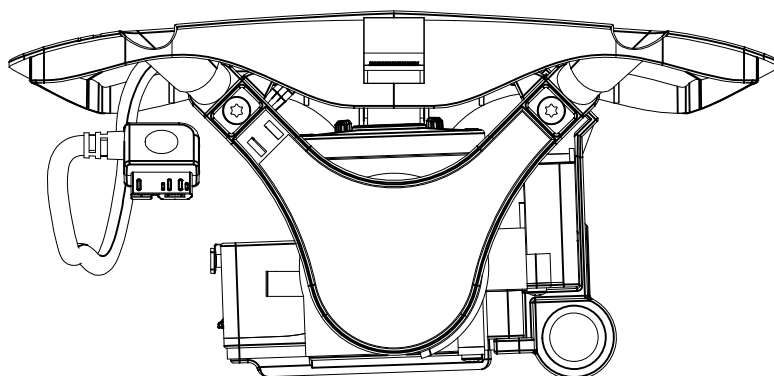

S.O.D.A. 3D Camera User Manual

Revision 1.10 / December 2021

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senseFly
AN AGEAGLE COMPANY

GENERAL INFORMATION

READ ALL USER MANUALS CAREFULLY BEFORE USING AND/OR SENSEFLY PRODUCTS.

USER MANUALS ARE AVAILABLE ON MY.SENSEFLY.COM WEBSITE.

senseFly products (the “Product(s)”) are intended for professional use only.

Always comply with Civil Aviation regulations and other applicable laws, act responsibly and follow the instructions in your senseFly User Manuals.

Regulations

ALL USE OF THE PRODUCT INCLUDING, BUT NOT LIMITED TO, THE USE CONFORM TO THE APPLICABLE LAW OF THE COUNTRY IN WHICH THE PRODUCT IS OPERATED, IS UNDER THE CLIENT’S SOLE RESPONSIBILITY.

Compliance with Export Control Regulations

Products may be subject to export control regulations in which case:

- The Product must not be used to design, develop, manufacture or use any military equipment or any nuclear, chemical or biological weapons, nor missiles classified under the U.S. Munitions List, the Common Military List of the European Union and the Wassenaar Arrangement Munitions List.
- The Product must not be exported, re-exported, sold or transferred, either directly or indirectly, to any military end-user (defined as a national armed organisation) or to anyone else if the Client is aware that the Product will be subsequently exported or transferred to a military end-user.
- The Client must comply with the dual use regulations if such regulations apply.
- The Client must declare that he/she is not a “Person subject to Sanctions” and must not export, re-export, sell or transfer the Product, either directly or indirectly, to any “Persons subject to Sanctions”. A “Person subject to Sanctions” is defined as any person, company or entity appearing on the list of specially designated persons established by the Security Council of the United Nations, the United States of America and the European Union.
- The Product must not be exported, re-exported, sold or transferred, either directly or indirectly to any “Country subject to Sanctions”. A “Country subject to Sanctions” is defined as any country subjected to international economic sanctions adopted and applied by the Security Council of the United Nations, the United States of America and the European Union.

Limited warranty

senseFly (the “Supplier”) warrants that the delivered Product will be free from defects in workmanship and materials for a period of twelve (12) months from the date of shipment by senseFly to the original Client. Should the Product malfunction due to defects in material and/or workmanship during this this defined period, the Client may request for the product to be repaired and/or replaced at no charge. If repair or replacement is not possible, a credit will be issued, provided that the malfunctioning Product is returned with its original proof of purchase.

In the event of the following, the Supplier reserves the right to reject warranty claims: A) The delivered items are not stored, maintained or used in accordance with their specifications. B) The delivered items are damaged due to carelessness, misuse, negligence or mishandling by the user. C) For defects due to normal wear and tear including, but not limited to, normal degradation, misuse, moisture or liquids, dust, proximity or exposure to heat, accidents, excessive strain, abuse, neglect, misapplication, non-authorised repairs or modifications, damages due to rain, water or humidity, or other causes for which senseFly deems is

user-generated. D) The delivered items are damaged during shipping. E) The warranty is void if the product is deemed to have been tampered with or opened.

Battery cells are excluded from warranty after first use.

The Client shall make available to the Supplier, at the Supplier's request, all data regarding maintenance parameters. The Client further agrees and acknowledges that the Supplier is entitled, at any time, to access, analyse and use all data available on the Client's Account regarding the maintenance parameters. If such data are not available for a reason over which the Supplier has no control or responsibility, including but not limited to an external service provider issue, network fault or power failure, the Supplier is under no obligation to provide the Limited Warranty coverage until such data is made available.

It is the Client's responsibility to check that the Product is compliant with applicable requirements under local laws and regulations. Before using the Product, the Client shall make any and all necessary checks to ensure that any additional provisions required by international or local authorities are taken into consideration and carried out.

There are no express or implied warranties, representations or conditions other than those stated in this Limited Warranty. This Limited Warranty is made in lieu of all other warranties, representations or conditions, whether expressed or implied, including without limitation, merchantability or fitness for a specific purpose.

The remedy set forth herein shall be the sole, exclusive remedy by senseFly with respect to the Product.

Limitation of liability

UNDER NO CIRCUMSTANCES WILL THE SUPPLIER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (EVEN IF THE SUPPLIER IS NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES) INCLUDING, BUT NOT LIMITED TO, ANY CRASH OR DAMAGES CAUSED BY THE CLIENT OR A THIRD PARTY WHILE OPERATING OR USING THE PRODUCT(S) (INCLUDING SIMULTANEOUS FLIGHTS OF PRODUCTS USING A SINGLE INSTANCE OF THE SOFTWARE, ENCRYPTION MODE) AND ANY DAMAGES CAUSED BY FAILURE OF THE AUTOPILOT, ELECTRONICS OR SOFTWARE (EVEN IF CAUSED BY A MALFUNCTION OF THE PRODUCT, AUTOPILOT, ELECTRONICS OR SOFTWARE), ANY LOSS OF REVENUE, LOSS OF PROFIT, OR LOSS OF DATA WHETHER BASED UPON ANY ALLEGED BREACH OF WARRANTY, REPRESENTATION OR CONDITION, CONTRACT, OR ANY OTHER CONDUCT INCLUDING NEGLIGENCE (INTENTIONAL OR OTHERWISE), GIVING RISE TO SUCH CLAIM. THE CLIENT SHALL NOT OPERATE THE PRODUCT(S) IN AREAS OR UNDER CIRCUMSTANCES WHERE A FAILURE COULD CAUSE DAMAGES AND/OR HARM TO PEOPLE, PROPERTY AND/OR ANIMALS.

Intellectual property rights

senseFly Products and software are protected by intellectual property rights. senseFly is the proprietor and legal and beneficial owner and/or the authorised licensee of any intellectual property rights within the Products, and senseFly is entitled to the benefit of all applications made for the grant of senseFly Intellectual Property Rights.

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Declaration of conformity



senseFly SA, Route de Genève 38, 1033 Cheseaux-Lausanne, Switzerland, declares under its sole responsibility that the product described in this user guide conforms with technical standards EN55032, EN55024, EN61000-4-2, EN61000-4-3, EN50581 in accordance with the provisions of the EMC Directive

2014/30/UE and the RoHS Directive 2011/65/UE.

Disposal of this product at the end of its life



At the end of this Product's life, please do not dispose of this Product in your general household waste. Instead, in order to prevent possible harm to the environment or human health from uncontrolled waste disposal, please dispose of this Product separately in accordance with your local laws and regulation. For more information on the separate collection systems for waste electrical and electronic equipment that are available for consumers, near your home, free of charge, please contact your local municipal authority.

You can also contact senseFly or the reseller from which you purchased your drone who may provide recycling services or be part of a recycling scheme.

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Website: <http://www.sensefly.com>

Technical support

senseFly and our resellers are dedicated to providing you with full professional product support. To submit a support ticket and/or view your outstanding tickets, please use our customer portal my.senseFly (<http://my.senseFly.com>). Log in with the same account details you used to download your drone's software (see the separate software information document in your senseFly drone's case).

In addition to support access, my.senseFly includes:

- Details of all your senseFly drones, including their serial numbers.
- The Knowledge Base – packed full of helpful articles, tips, tutorials and webinars.
- Download links for the latest versions of our software.

The S.O.D.A. 3D



Thank you for choosing **S.O.D.A. 3D** (Sensor Optimised for Drone Applications 3D), a sensor specifically designed for 3D mapping using drones. The **S.O.D.A. 3D** is one of the lightest sensors on the market and the only one to seamlessly provide oblique and nadir photos for enhanced 3D modelling. It has high-stability optics and built-in dust and splash protection. It provides extremely accurate images and features:

- The ability to tilt and take 3 photos in quick succession, 2 of them oblique
- A 20 Mpx RGB sensor with 28mm focal lens
- Automatic capture settings optimised for use in drones
- Tight integration with senseFly drones, optimised for precise camera control
- A weight of 76 grams, perfect for senseFly drones
- A removable protective lens
- Rubberised covers on all ports
- An SD card slot



Caution: The **S.O.D.A. 3D** has been designed to be compatible with senseFly drones. It is therefore not recommended to use it for other purposes than as a payload in a senseFly drone.

Package contents

The following items are included with your camera:

- 1 × 32 GB SD card
- 1 × USB type A adapter
- 2 × protective lens
- 1 × cleaning kit (cleaning cloth and tool)

Depending on your order, your package may also include additional items. Please verify upon delivery that your package is complete. In case of a missing item, please contact senseFly or your reseller immediately.



Caution: Only use approved SD cards.

Only fly with high-performance, Secure Digital High Capacity (SDHC) SD cards that have a speed class of at least UHS 3 (U3) capable of 85 MB/s writing and 95 MB/s reading data rates, formatted with the FAT32 file system.

Flying with any other SD card risks causing a malfunction and will void your warranty in case of an incident.

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1 About S.O.D.A. 3D

S.O.D.A. 3D is a lightweight camera specifically designed for drone mapping applications. It can take images up to 20 Mpx with a focal length of 28 mm (35 mm equivalent).

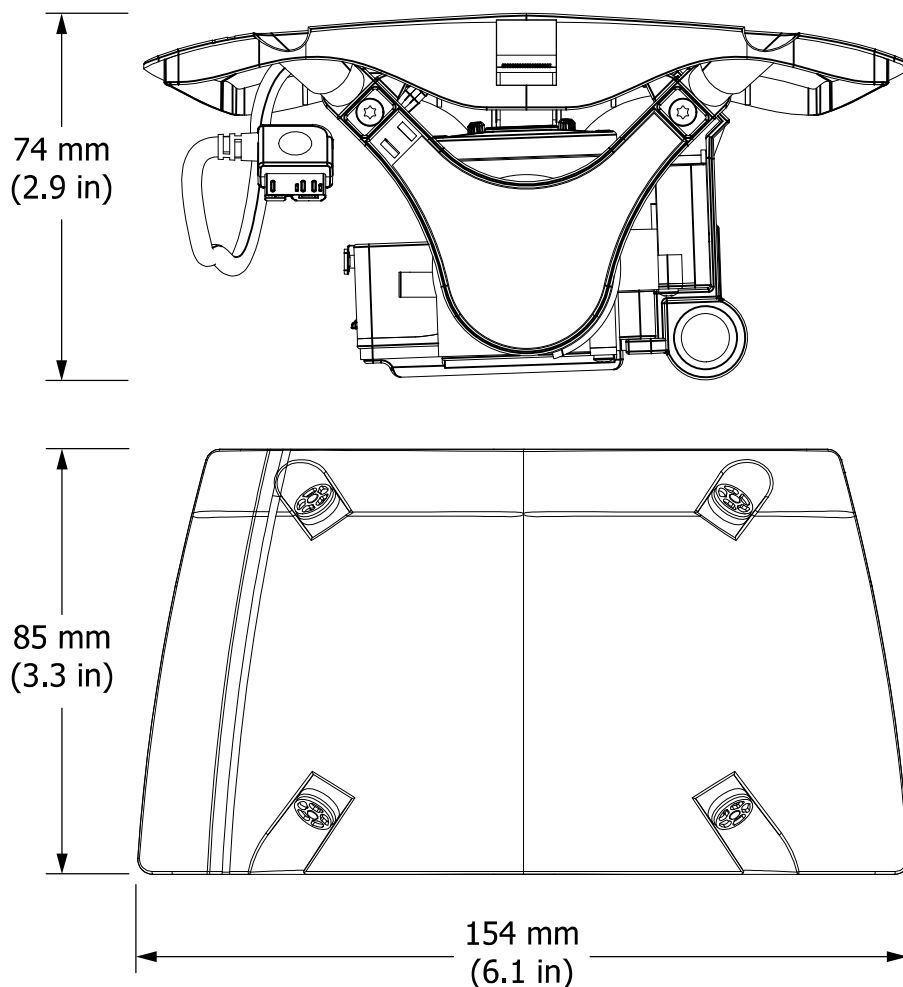
The camera's parameters are controlled by the drone and set automatically to the optimum for your drone's flight conditions.

Weight:

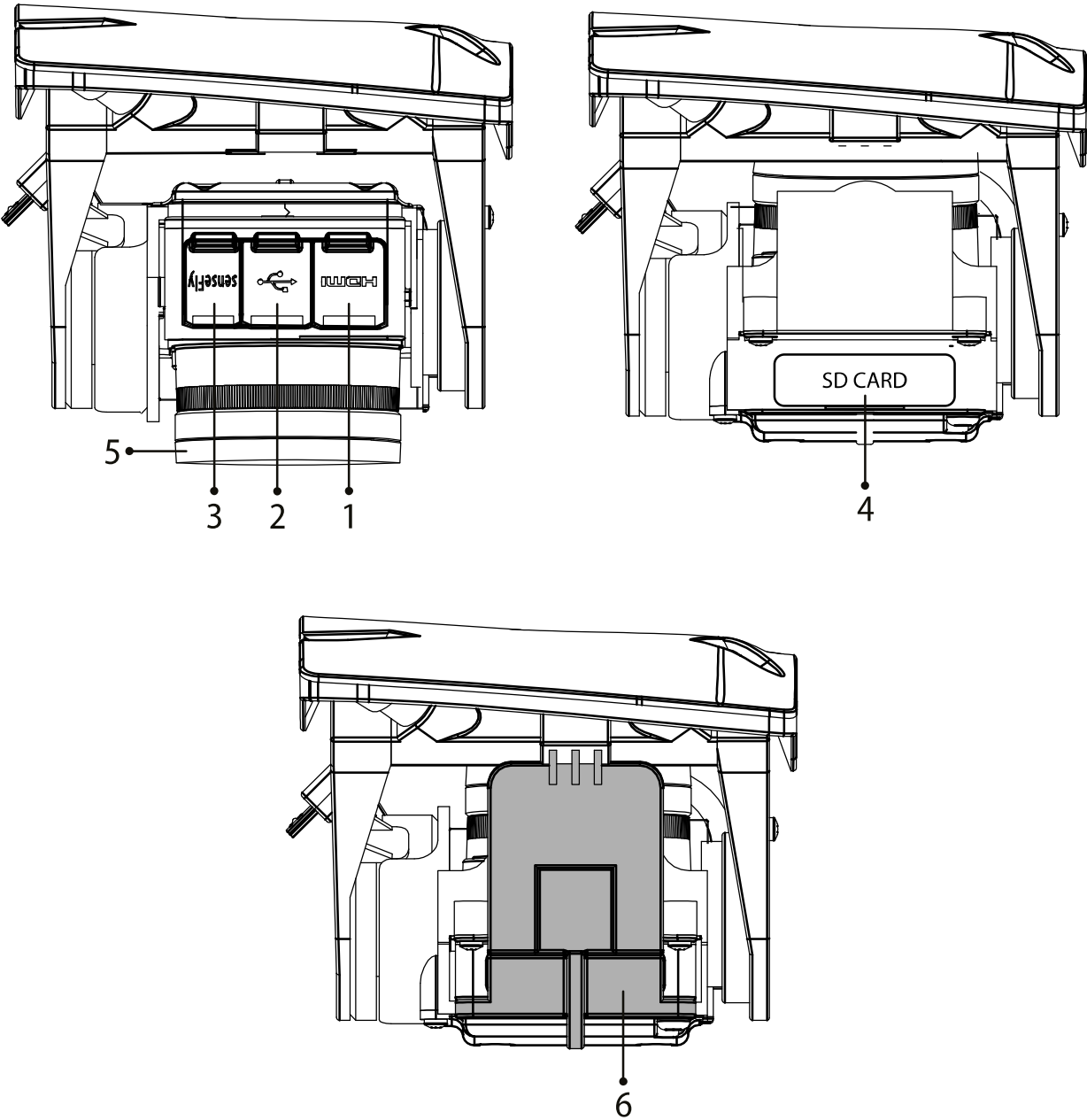
S.O.D.A. 3D + SD card + protective lens

207 g (7.30 oz)

Dimensions: 85 x 154 x 74 mm (3.3 x 6.1 x 2.9 in)



S.O.D.A. 3D's features



-
- | | |
|----------|--|
| 1 | Micro HDMI connector
Connects the camera to a monitor or an HDMI-equipped drone. |
| 2 | Micro USB connector
Permanently connects the camera to the tilting gimbal.* |
| 3 | eBee connector
Can connect the camera to a senseFly drone [†] . |
| 4 | SD card slot
Slot for an SD memory card. |
| 5 | Protective lens
Replaceable lens screwed onto the front of the camera. |
| 6 | Gimbal clamp
Holds the tilting gimbal still for transport. |
-

2 Using S.O.D.A. 3D with a senseFly drone

When flown in a senseFly drone, the camera is fully integrated into the drone and with *eMotion*:

- The camera is controlled by the drone's autopilot.

* do not attempt to unplug

† not necessary when using S.O.D.A. 3D

-
- You monitor the camera through *eMotion*.
 - The camera has no battery of its own. It is powered through its connection to the senseFly drone.

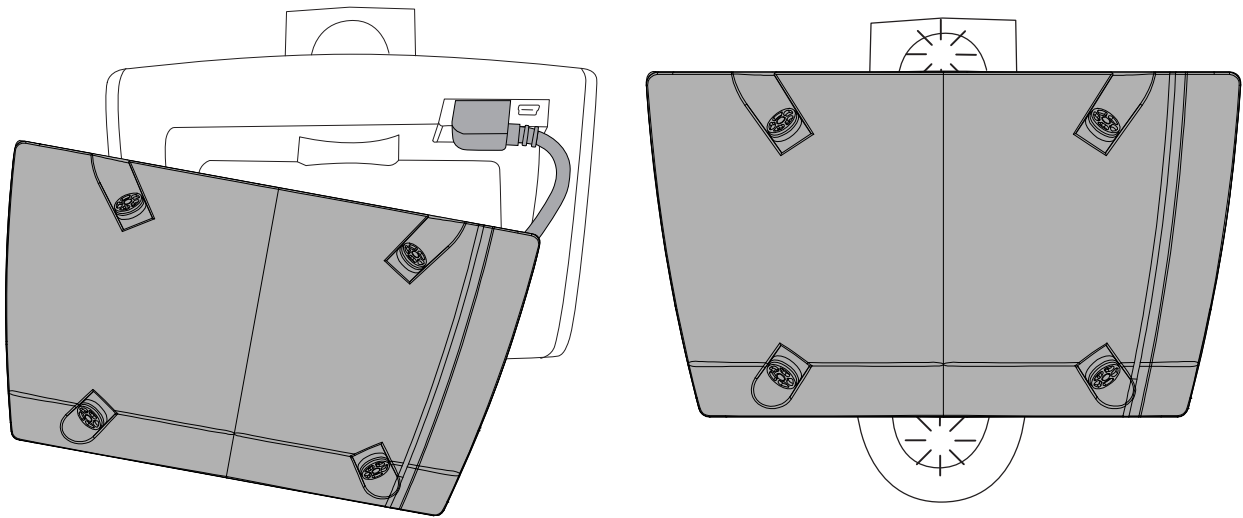
2.1 Pre-flight checks


Before every flight with **S.O.D.A. 3D**:

- Make sure that the protective lens is installed on the camera.
- Make sure that the camera's lens and the protective lens are clean. If necessary, use the microfibre cloth and cleaning fluid, or the cleaning tool to clean them.
- Make sure there is an SD card in the camera, that it is not write-protected and has enough empty space.
- Make sure that the camera is properly installed in the drone.
- Make sure that the camera's connector cable is properly connected to the connector in the drone's camera bay.
- Before take-off, make sure that the lens cap has been removed.
- Before take-off, make sure that the gimbal clamp has been removed.

2.2 Installing the camera into the drone

1. Ensure that nothing is connected to your drone. That is, your drone's battery is not connected, and your drone is not connected to a computer.



2. Plug the camera connector into the connector with the  icon within the senseFly drone's camera bay.
3. Remove the gimbal clamp.
4. Install the camera into the drone's camera bay.



Caution: To protect the drone's and the camera's electronics, never connect the drone's battery while the drone has both a camera and a computer connected.



Caution: senseFly drones are not designed to fly without the camera. Attempting to fly without the camera may render the drone unstable, which may eventually lead to a crash.



Caution: Connect only compatible senseFly cameras to the drone's camera port. Never try to connect anything else.



Caution: Once the drone's battery has been connected, do not touch any of the camera's metallic parts. A static electricity discharge can cause the camera's gimbal to temporarily malfunction. If this happens, disconnect then reconnect the drone's battery.

3 Flying S.O.D.A. 3D

With the camera installed in your senseFly drone and connected to *eMotion*, camera information is shown in the  Camera tab on *eMotion*'s Drone panel.

- **Camera type**
The camera you have installed in your drone and its firmware version.
- **Camera state**
Your camera's status, for example, On or Standby.
- **Number of photos**
The number of photos taken in the current flight.
- **External storage**
Indicates the amount of storage space that is left.

3.1 Camera settings

The following settings are available:

- **Picture format**

JPG	Camera will take only jpeg photos
JPG + DNG	Camera will take jpeg and raw (DNG) photos
- **White balance**

Automatic	Automatically adjusted by camera
Daylight	Ideal for open, sunlit areas
Cloudy	Ideal for overcast weather
Shady	Ideal for areas in shadow, for example, in a valley
- **Exposure bias**
The amount of under- or over-exposure you want.

- **Exposure time target**

The camera will try and maintain this photo exposure time. It will only override your chosen exposure time if correct photo exposure cannot be achieved by adjusting aperture and sensor sensitivity (ISO).


- **ISO max**


The camera will not exceed this sensitivity level when adjusting exposure.



Note: In almost all cases, the cameras default settings will be sufficient.

How to save then reuse your own camera settings

Set the camera settings you want then click  Save custom settings.


Next time you connect to a drone that has a **S.O.D.A. 3D** installed in it, click  Load custom settings and *eMotion* will restore your saved settings.

How to restore the default camera settings

Click  Restore factory settings to restore the following settings:

Picture format	JPEG
White balance	Automatic
Exposure bias	0.0 EV
Exposure time	1/1000 s
ISO max	800

Calibration

The camera will automatically calibrate its gimbal during take-off. If this fails more than once, consider using the Calibrate button on *eMotion's*  Camera tab.



Caution: The camera will turn during calibration. Remove the gimbal clamp. Only calibrate with the drone held off the ground or any surface. Make sure the camera can turn freely.

Controlling the camera's temperature

The **S.O.D.A. 3D** is an extremely capable and compact camera, and as a result generates some heat. When flying in high ambient temperatures, care should be taken to keep it cool:

To protect itself against overheating, the camera will stop taking photos and raise a Camera malfunction warning if its internal temperature gets too high. If this happens, land your drone and allow the camera to cool down.

4 Updating the S.O.D.A. 3D

eMotion will inform you when a firmware update is available.

To update the camera's firmware, follow the instructions in our Knowledge Base, part of my.senseFly.

5 Retrieving your flight data

First, make the photos available to *eMotion*'s Flight Data Manager...

To obtain the photos the camera has taken, remove the SD card and insert it into your computer's SD card slot.

Next, launch *eMotion*'s Flight Data Manager and use it to treat and import the photos and flight logs...

Choose From SD card / USB camera when choosing data to import.

See your *eMotion* user manual for instructions on using the Flight Data Manager.

6 Processing your flight data

You can analyse the photos taken by the camera with photogrammetry software. One example of such software is **Pix4Dmapper** from Pix4D (www.pix4d.com).

If using **Pix4Dmapper**, follow the instructions in your *eMotion* user manual to create a .p4d (**Pix4Dmapper**) project. You can then use **Pix4Dmapper** to create orthomosaics and DSMs.

For more information on processing your flight data, see our Knowledge Base, part of my.senseFly.

7 Camera maintenance

Precautions for use and maintenance

- Only use accessories specified by the manufacturer.
- If sand or dust gets into the camera it may be irreparably damaged and no longer function correctly.
- Do not use the camera in adverse weather conditions (rain, strong wind and snow) or when visibility is poor (at night).
- Keep the camera away from high voltage power lines, buildings or any other potentially hazardous areas.
- Do not use this device near liquids. Do not place the camera in water or on a wet surface as this could cause irreparable damage.
- Avoid making the camera undergo significant changes in altitude.
- Do not leave the camera out in the sun for extended periods.
- Risk of ingestion of small objects. The packaging is not part of the product and must be discarded as a safety measure.

Cleaning the lenses

If dust or dirt gets on the protective lens and/or the camera lens:

1. Use the microfibre cloth (supplied) to clean the lens.
2. Remove any remaining traces with the cleaning fluid and supplied cleaning tool.

8 Specifications

Optics

Focal length	Fixed 28 mm (35 mm equ.)
Min/max. focus distance	10 cm/infinity
Aperture	F2.8 – 11 Multistage iris diaphragm

Sensor

Resolution	20 Megapixels
Sensor size/type	BSI CMOS 1-inch
Shutter	Mechanical
Max. shutter speed	1/2000 s
ISO	125-6400
Max. stabilised gimbal tilt	45°
White Balance	Auto

Photo acquisition

Format	JPEG & DNG
Aspect ratio	3:2 5472x3648 px
JPEG Colour space	sRGB



<http://www.sensefly.com/support/>