

Sustainable St Albans Imaging Camera Information Pack Winter 2025-6

Summary

The Sustainable St Albans Thermal Imaging Camera initiative started in 2014, with the purchase of our first camera using a Herts County Council localities budget grant, additional localities budget grant in 2016 enabled us to purchase a second camera. A further camera was purchased in 2021. Since 2014, over eight hundred residents have borrowed one of the cameras and our volunteers have organised approximately twenty information sessions each winter.

Thermal Imaging Cameras can be used to see where heat is leaking from your house. The camera works most effectively in the evenings of the winter months when the outside temperature drops low enough to highlight the heat leaking out from inside a house. You can use the camera to walk around the inside and outside of your house to see where heat is escaping. Borrowers have, for example, used the camera to find draughts from window frames or doors, check if their roof is adequately insulated and, find out the location of missing insulation in extensions.

This Information Pack is Sustainable St Albans' own in-house guide; it is organised as follows:

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2. ST ALBANS thermal imaging camera Fluke TiS20	Pages 7-10
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Please note that you must attend a Sustainable St Albans Thermal Imaging Camera Information Session before you book to borrow the camera, you may also borrow the camera again or in future years, e.g. when you have made changes to your home. We hope that you will find borrowing the camera useful.

When you have finished using the camera

- Please charge the **St Albans** or **Community** cameras after use so that it is ready for the next person to use (the **Harpenden** camera should NOT be charged)
- Pictures left on the camera will periodically be deleted and may also be used (anonymously) for developing this guide or publicity. Please delete your pictures after you have finished with the camera if you do not wish them to be viewed or used in this way (see the relevant camera section for how to do this).
- Please check that the charging cable and the other things are in the bag.
- Please also complete the Feedback Form online at <https://forms.gle/is1eqiyQxMn4r12x8> (you could also print the form and return it with the camera.) We very much welcome any comments on using the camera and what you have learnt from using the camera, this will enable us to develop the guide for future use.

Donations

Please consider making a donation to the thermal imaging camera project. The camera project is run by volunteers from the charity Sustainable St Albans and the camera is free for residents of the St Albans District to borrow. We are very grateful for any donations towards the costs of running the project, we suggest a donation of £10. Donations can be made when you book the camera via Eventbrite, via our website <https://sustainablestalbans.org/donate/> or **by cash, cheque, or Bank transfer** (Sustainable St Albans; Sort Code: 08 92 99; Account No 65843671). Please use the reference "TiC Donation". If you are a UK taxpayer and complete the **Gift Aid form** in the **Annex**, we can also reclaim the tax on your donation.

SSA Thermal Imaging Camera Volunteers, thermal.imaging@sustainablestalbans.org;
Website: <https://sustainablestalbans.org/thermal-imaging/>

Part A: Quick Guide to using the thermal imaging cameras

Before you start

- Our cameras are expensive pieces of equipment. Please look after them and please do not leave them unattended, such as in a car.
- The camera works most effectively in the evenings during winter months when the outside temperature drops low enough to highlight the heat leaking out from inside a house. It is optimal for the indoor temperature to be at least 10 degrees warmer than outside. The bigger the temperature difference, the clearer the results.
- It can be used in daytime if the temperature difference is sufficient. Early morning is best, to avoid false information given by direct sunlight warmth.
- If you use the camera outdoors, please do not point the camera at the sun or use it in the rain or in strong wind; this could damage the camera, and the images will be distorted.
- The Community camera has a laser (for pinpointing regions). We advise you to keep the setting for the laser off, and to avoid using the black trigger altogether on this model. You should never point this camera at the sky or at the faces of people or animals.
- It may help to take written notes, or a voice recording, about what you are viewing as you go along – many of the images may look similar after the event – or unrecognisable!

When borrowing the camera, you will have:

The Thermal Imaging Camera bag, containing the camera, the charging cable for the camera, and the USB cable to connect to a computer.

Further resources

You can also download from our website <https://sustainablestalbens.org/thermal-imaging/>

- The manufacturer's manual for each camera
- the presentation from the information session

Our website also provides

- Links to watch "How to use Camera" videos for each of the cameras
- resources relating to insulating your home.

Please note that the documents are different for the Harpenden Camera, the Community Camera and the St Albans Camera. The next section gives the safety information and our quick guide to using each camera.

Section 1 - Harpenden thermal camera, Flir EX range Manufacturer's Safety Information

WARNING

Applicability: Class B digital devices.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the 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:

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

WARNING

Applicability: Digital devices subject to 15.19/RSS-GEN.

NOTICE: This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s). 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.

WARNING

Applicability: Digital devices subject to 15.21.

NOTICE: Changes or modifications made to this equipment not expressly approved by FLIR Systems may void the FCC authorization to operate this equipment.

WARNING

Applicability: Digital devices subject to 2.1091/2.1093/KDB 447498/RSS-102.

Radiofrequency radiation exposure Information: The radiated output power of the device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized.

WARNING

This device is granted pursuant to the Japanese Radio Law (電波法) and the Japanese Telecommunications Business Law (電気通信事業法). This device should not be modified (otherwise the granted designation number will become invalid)

WARNING

Do not disassemble or do a modification to the battery. The battery contains safety and protection devices which, if damage occurs, can cause the battery to become hot, or cause an explosion or an ignition.

WARNING

If there is a leak from the battery and you get the fluid in your eyes, do not rub your eyes. Flush well with water and immediately get medical care. The battery fluid can cause injury to your eyes if you do not do this.

WARNING

Do not continue to charge the battery if it does not become charged in the specified charging time. If you continue to charge the battery; it can become hot and cause an explosion or ignition. Injury to persons can occur.

#T559828; r. AQ/75691/75691; en-US 2

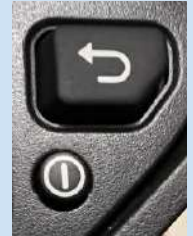
Section 1 - Using the Harpenden Thermal Imaging Camera, the FLIR E6 XT

When borrowing the camera, you will have:

The Thermal Imaging Camera bag, containing the Flir E6 XT camera, the charging cable for the camera, the USB cable to connect to a computer, along with books and resources that might be useful to read.

You can also download from our website:

- The manufacturer's manual for the Flir E6 XT
- The "How to use the Harpenden camera" video from the website



Getting started

- Please read the manufacturer's safety information (above) about the camera.
- To switch on: push and hold the small round on/off button beneath the button with the curved arrow.
- Open the sliding screen cover flap on the back of the camera by sliding the lens cap lever beneath the lens.
- Point the camera at the area you want to look at to see a thermal image.
- You will need to stand at least 0.3m away from the area you wish to view but it's best to be further away than this to get some context to the image. There is no facility to 'zoom' the image.

Returning the camera

- There is no need to charge the camera before you return it (the charging camera is provided for use ONLY if you use the camera extensively and you need to recharge it to use it yourself).
- Pictures left on the camera will periodically be deleted and may also be used (anonymously) for developing this guide or publicity. **Please do NOT delete the images from your computer** [whilst this appears to delete them they still use the camera's memory and the next camera borrowers will not be able to save any images if the camera's memory is full]. **Please delete the images from the camera:** press the large menu square menu button; select '*settings*' (far left) and click; select '*device settings*' and click; select '*reset options*'; select '*Delete all saved images...*'; select '*Delete*' and click to delete the saved images.

1. Changing settings on the camera

- The (default) settings as they are work fine but if you want to alter the settings you need to press the square button in the centre. Remember, we do need the default settings back to where they were when you picked up the camera, so the next user does not have to readjust the settings.
- If you do want to alter the settings, press the square button. Left to right this brings up the settings, image mode, measurement, colour, and temperature scale icons. On each icon press the square button again to delve further.
- Under 'measurement', Hot spot and cold spot find the respective hot and cold spots within the rectangular box on the screen.
- Temperature scale is set to auto but there is a manual mode; the upper and lower temperatures on the right of the camera screen can be adjusted using the square ring that surrounds the square button (left/right (selects both upper and lower temperatures or the lower or the upper); up/down adjusts the temperature whilst in each setting).

The main default settings are:

- Image mode: Alignment distance 1m; Thermal MSX
- Measurement; Center spot (American spelling on the camera)

- Color; Iron
- Temperature scale; Auto

2. Looking at the images on the camera

- The colour scale moves from blue being cold through red to yellow being hot.
- When viewing a property from inside; blue areas show cold air coming into a house and cold spots.
- When viewing a property from outside; yellow/red shows heat escaping.
- All is relative! Use the temperature scale on the side of the image to understand what you are seeing. You are looking for a big differential in temperatures in places where there shouldn't be a large difference. See Part B.
- The spot temperature shown on the screen relates to the small white target circle in the middle of the screen.
- You will need to look obliquely at surfaces that reflect heat e.g., windows, pictures and other reflective surfaces as your own body heat will reflect off reflective surfaces, such as glass.
- The camera can be used to observe your walls, ceiling etc. as you move around the house.
- To 'capture' the image, pull the black trigger; it is then saved to the camera.



3. Saving images

- Capture the image by using the black trigger. The images can be retrieved from the camera and be transferred to a computer via a USB cable as well as Wifi. One can also video the screen using a phone, tablet, or camera; this is easier with a smartphone or small camera as one needs both hands, one to carry each device.

4. Downloading images

- The images can be retrieved from the camera and be transferred to a computer via a USB cable. Please be very careful when inserting the cable into the camera.
- The drive on the camera can then be seen on your computer as an external drive. You can then copy the images to your computer or laptop.
- Please do NOT delete the images from your computer [whilst this appears to delete them they still use the camera's memory and the next camera borrowers will not be able to save any images if the camera's memory is full].
- **Please delete the images from the camera:** press the large menu square menu button; select 'settings' (far left) and click; select 'device settings' and click; select 'reset options'; select 'Delete all saved images...'; select 'Delete' and click to delete the saved images.

5. What is manual temperature range mode and why would I use this?

- The temperature range is set automatically to encompass the highest and lowest temperatures in your view, but it can be adjusted manually. In some situations, the automatic temperature range is trying to capture an image with a very wide temperature range. Outside at night, the sky temperature will read up to -40 degrees. Inside a house, a working radiator would be very, very hot. This can prevent the camera from showing the more subtle temperature differences that you are looking for.

- You can concentrate the camera's temperature setting on a range of your choosing to block out that hot radiator or discount the cold night sky and therefore improve the thermo-image you are seeing.

6. How do I change the temperature scale mode?

The camera can operate in different temperature scale modes:

- **Auto mode (the default):** In this mode, the camera is continuously auto-adjusted for the best image brightness and contrast.
- **Manual mode:** This mode allows manual adjustments of the temperature span and the temperature level.

To change the temperature mode to manual

- Push the center of the navigation pad; this displays a toolbar.
- On the toolbar, select Temperature scale; this displays a toolbar.
- On the toolbar, select Manual.

To change the temperature span and the temperature level in Manual mode, do the following:

- Push the navigation pad left/right to select (highlight) the maximum and/or minimum temperature.
- Push the navigation pad up/down to change the value of the highlighted temperature.

When you have finished using the camera in manual mode please return it to auto mode

- Push the center of the navigation pad; this displays a toolbar.
- On the toolbar, select Temperature scale; this displays a toolbar.
- On the toolbar, select Auto.

Section 2. St Albans Camera: Fluke TiS20 Manufacturer's Safety Information

FLUKE®


TiS10, TiS20 TiS40, TiS45 TiS50, TiS55 TiS60, TiS65 Performance Series Thermal Imagers Safety Information

Go to www.fluke.com to register your product and find more information.

A **Warning** identifies conditions and procedures that are dangerous to the user.

Warning

To prevent eye damage and personal injury:

- Do not look into the laser. Do not point the laser directly at persons or animals or indirectly off reflective surfaces. 
- Do not open the Product. The laser beam is dangerous to eyes. Have the Product repaired only through an approved technical site.

Additional laser warning information is on the inside of the Product lens cover.



hwj010.eps

PN 4633357 July 2015
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Specifications are subject to change without notification.
All product names are trademarks of their respective companies.

Warning

To prevent personal injury:

- Read all safety information before you use the Product.
- Carefully read all instructions.
- Use the Product only as specified, or the protection supplied by the Product can be compromised.
- Replace the batteries when the low battery indicator shows to prevent incorrect measurements.
- Do not use the Product if it operates incorrectly.
- Do not use the Product if it is damaged.
- See emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.
- Do not disassemble or crush battery cells and battery packs.
- Remove batteries to prevent battery leakage and damage to the Product if it is not used for an extended period.
- Connect the battery charger to the mains power outlet before the charger.
- Use only Fluke approved power adapters to charge the battery.
- Keep cells and battery packs clean and dry. Clean dirty connectors with a dry, clean cloth.

Safety Specifications

Operating temperature -10 °C to +50 °C

Storage temperature -20 °C to +50 °C

Battery charging temperature 0 °C to 40 °C

Altitude

Operating 2,000 m

Storage 12,000 m

* the TiS20 does not have a laser

Section 2. Using the St Albans Thermal Imaging Camera

1. When borrowing the camera you will have

The St Albans Thermal Imaging Camera bag containing:

- The TiS20 Fluke Thermal Imaging Camera,
- The charging cable for the camera,
- The micro SD memory card and converter for standard SD memory card reader,
- The USB lead to connect the camera to a laptop to use **Fluke Connect** Software.

You can also view the “How to use the St Albans camera” video again from the website

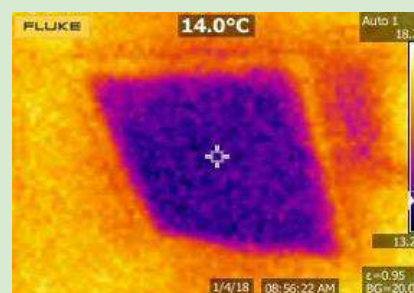
<https://sustainablestalbans.org/thermal-imaging/> and download the manufacturer’s manual for the TiS20 Fluke camera. Their diagram of the key features of this model is reproduced in this section.

2. Getting started

- Please read the manufacturer’s safety information (above) for the camera.
- To switch on: push and hold the green power button to the right of the camera screen.
- **Open the screen cover flap on the back of the camera.**
- Point the camera at the area you want to look at to see a thermal image.
- You will need to stand at least 1.2m from the area you wish to view. There is no facility to ‘zoom’ the image.
- Press the ↓ key to switch from visual to thermal, and combined visual/thermal modes.

3. Looking at the images (pictures) on the camera

- The colour scale moves from blue being cold through red to pale yellow being hot.
- When viewing a property from inside; blue areas show cold air coming into a house and cold spots. When viewing a property from outside; yellow/red shows heat escaping.
- **Everything is relative!** Use the temperature scale on the side of the image to understand what you are seeing. You are looking for a big difference in temperatures in places where there shouldn’t be a large difference. See Part B.
- The spot temperature shown on the screen relates to the small white target cross in the middle of the screen.
- You will need to look obliquely at surfaces that reflect heat e.g. windows, pictures and other reflective surfaces as your own body heat will reflect off reflective surfaces, such as glass.
- The colour palette is set as “**ironbow**”. It can however be changed to a variety of other colour scales (**press function button F2, then image, then palette**). Please reset it after you have finished.
- The camera can be used to observe your walls, ceiling etc. as you move around the house.
- To ‘freeze’ the image, pull the green trigger. Pulling it again unfreezes it. Ignore the black trigger.
- If you would like to save the images to look at after you have returned the camera, the next sections (5 -8) describe ways to do this



4. Saving images, the easy way (we recommend this way)

Simply take a photo of the camera screen (‘freeze’ the image first) with your phone or iPad.

5. Taking and saving JPEG images to a memory card (we recommend this way)

- The camera has internal memory, however it is set up for you to save images onto the Micro SD memory card supplied with it. (You may wish to use your own Micro SD card, but please remember to return SSA's Micro SD memory card before returning the camera!)
- To insert the Micro SD memory card, gently push the card into the slot on top of the camera (see diagram below) until it catches.
- Check the picture will be saved to the SD card - **Press F2, then settings, then image storage to choose the SD card** if it is not already set to that. *It is important to select this before saving images.*
- To view the pictures later you will probably want them to be in a jpeg format. To check / change to JPEG settings **Press F2, then settings, then file format and select JPEG**
- You are then ready to take pictures.
- To capture an image, ***pull the green trigger on the back of the camera to 'freeze' it and then choose function button F1*** if you wish to save the image.
- To look at the pictures you have saved on the camera's screen, ***press the black (memory) button*** and it will display mini images, one is highlighted.
- ***Use the arrow buttons*** to select a mini image and ***press F1 to view it.***
- ***To delete an image, select F2.***
- To eject the Micro SD memory card, push in on the exposed edge of the card with a finger nail and release. The card should pop partially out after you release it. Carefully pull the card out of the slot.
- Insert it into the Micro SD card converter supplied to transfer the images to your device.

6. Using Fluke Connect apps to view pictures on your phone and transfer them via email (less reliable)

- First download the '**Fluke Connect**' app onto your phone from iTunes / the App Store.
- The camera can connect via its internal Wi-Fi to your phone or tablet.
- If you see Wi-Fi in white on the camera's screen (top left), this means that the camera's Wi-Fi is ready to connect to your device. If this is not shown, then to switch on the camera's Wi-Fi ***press function button F2, then settings, then wireless, then select Wi-Fi hotspot.*** You will then see ***Wi-Fi*** in white on the camera's screen.
- On your phone or tablet, select "**FLUKE-Camera**" as the Wi-Fi network; *you will also need to switch Bluetooth off.*
- The images need to be in IS2 format; to check that this is the case ***press F2, then settings, then file format, and the format should be IS2;*** if this is not the case, select IS2.
- Open the '**Fluke Connect**' app and select the '**Thermal imager**'.
- Now, when you capture an image it will appear on your phone screen and you just follow the options on your phone to transfer the images via email. There are options to send pictures in various formats including pdf and IS2. You can send a selection of images in one email by going to the '**Measurements**' item on the main menu and selecting them.

7. The images can also be transferred to PCs (but not to Macs) (refer to the Fluke manual).

You will need to download '**Fluke Connect**' software to your PC; the USB cable supplied can then be used to transfer the images to your PC.

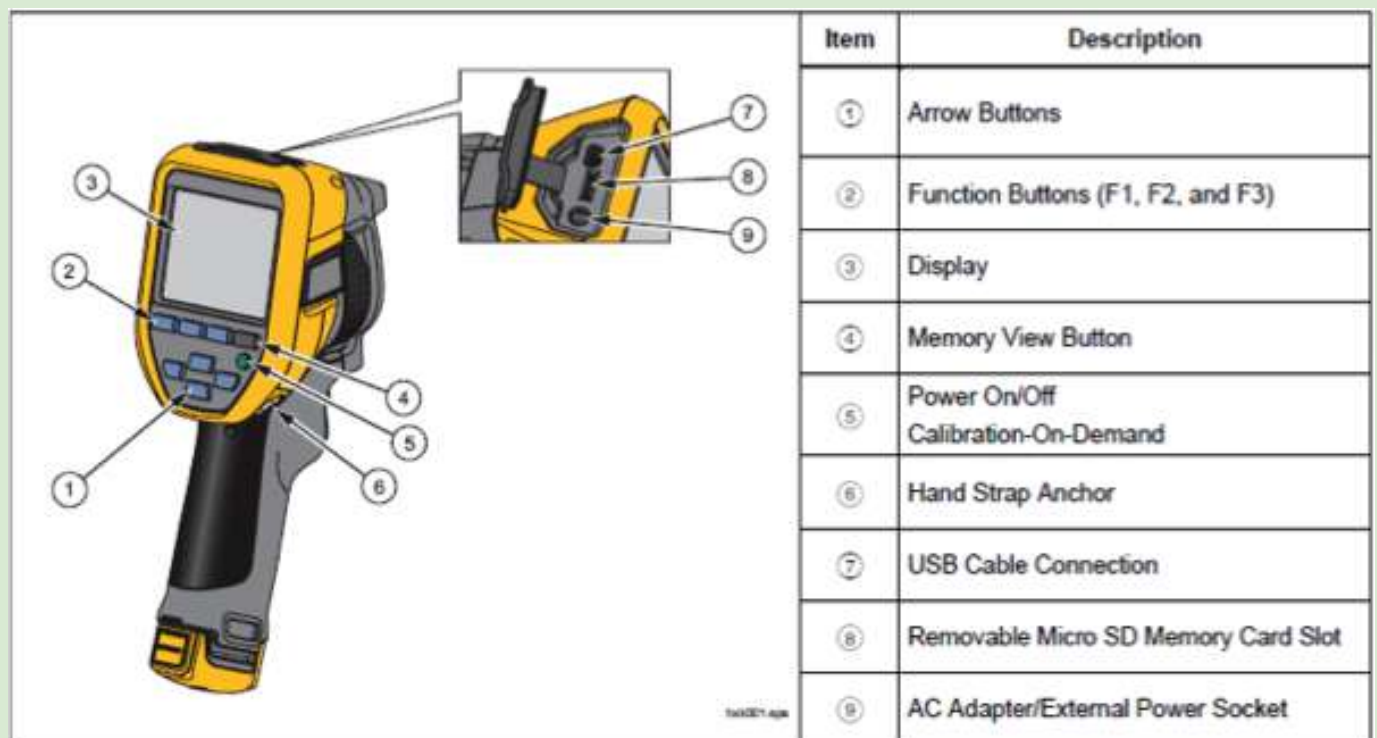
8. Changing settings on the camera

- The (default) settings as they are work fine but if you want to alter the settings you need to press the F2 function button to see the menus. Remember, we do need the default settings back to where they were when you picked up the camera, so the next user does not have to readjust the settings.
- Measurement
 - Range (auto Range); Emissivity 0.9; Background 15 degrees; Center Box (On)

- Temperature scale; Auto

8. How do I manually set the camera temperature range and why would I do this?

- The temperature range is set automatically to encompass the highest and lowest temperatures in your view but it can be adjusted manually.
- In some situations, the automatic temperature range represents an image with a very wide temperature range. Outside, the sky temperature (when cloud-free) may read down to minus 40 degrees. Inside a house, a working radiator would be very hot. This can prevent the camera from showing the more subtle temperature differences that you are looking for.
- You can alter the camera's temperature setting to a range of your choice to block out that hot radiator or discount the cold clear sky and therefore improve the thermo-image you are seeing.
- There's a **simple way** to select a preferred temperature range by pointing the camera at a view of objects within this range and holding down **function button F1** until **manual** is displayed above the temperature scale on the far right hand side of the image..
- Now **this** range keeps within the temperature limits whatever you view, until **function button F1** is held down again and the temperature range reverts to **auto**.
- Objects below the temperature range appear grey. Objects above the temperature range are green.
- The > arrow widens the span of the temperature range. The < arrow shrinks the span of the range. The 'up' arrow moves the entire fixed temperature range up by small increments (1 degree or less). It is easier to 'freeze' the image first before using the arrow buttons. We recommend practising first.
- There are instructions on page 16 of the Fluke TiS20 manual if you prefer to set the temperature limits and temperature span manually by using the function buttons.
- Please check that the temperature range is set to **AUTO** when you return the camera.



Section 3. Community Camera: Fluke TiR105 Manufacturer's Safety Information

Safety Specifications

Operating temperature -10 °C to +50 °C
Operating temperature
without battery pack -20 °C to +50 °C
Battery charging temperature 0 °C to 40 °C

LIMITED WARRANTY AND LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for two years from the date of purchase. This warranty does not cover fuses, disposable batteries, or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, contact your nearest Fluke authorized service center to obtain return authorization information, then send the product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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11/99

FLUKE®

Ti90, Ti95 Ti100, Ti105, Ti100, Ti125 TiR105, TiR110, TiR125 Thermal Imagers

Safety Information

Go to www.fluke.com to register your product and find more information.

A **Warning** identifies conditions and procedures that are dangerous to the user.

Warning

To prevent eye damage and personal injury:

- Do not look into the laser. Do not point laser directly at persons or animals or indirectly off reflective surfaces.
- Do not look directly into the laser with optical tools (for example, binoculars, telescopes, microscopes). Optical tools can focus the laser and be dangerous to the eye.
- Use the Product only as specified or hazardous laser radiation exposure can occur.
- Do not open the Product. The laser beam is dangerous to eyes. Have the Product repaired only through an approved technical site.

PN 4425638 May 2014
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Additional laser warning information is on the inside of the Product lens cover.



gju05.eps

Warning

To prevent personal injury:

- Read all safety information before you use the Product.
- Carefully read all instructions.
- Use the Product only as specified, or the protection supplied by the Product can be compromised.
- Replace the batteries when the low battery indicator shows to prevent incorrect measurements.
- Do not use the Product around explosive gas.
- Do not use the Product if it operates incorrectly.
- Do not use the Product if it is damaged.
- See emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.
- Do not disassemble the battery.
- Use only Fluke approved power adapters to charge the battery.
- Do not disassemble or crush battery cells and battery packs.
- Use only specified replacement parts.
- Have an approved technician repair the Product.

Safety Specifications

Operating temperature -10 °C to +50 °C
Operating temperature
without battery pack -20 °C to +50 °C
Battery charging temperature 0 °C to 40 °C

LIMITED WARRANTY AND LIMITATION OF LIABILITY

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THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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FLUKE®

Ti90, Ti95 Ti100, Ti105, Ti100, Ti125 TiR105, TiR110, TiR125 Thermal Imagers

Safety Information

Go to www.fluke.com to register your product and find more information.

A **Warning** identifies conditions and procedures that are dangerous to the user.

Warning

To prevent eye damage and personal injury:

- Do not look into the laser. Do not point laser directly at persons or animals or indirectly off reflective surfaces.
- Do not look directly into the laser with optical tools (for example, binoculars, telescopes, microscopes). Optical tools can focus the laser and be dangerous to the eye.
- Use the Product only as specified or hazardous laser radiation exposure can occur.
- Do not open the Product. The laser beam is dangerous to eyes. Have the Product repaired only through an approved technical site.

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Additional laser warning information is on the inside of the Product lens cover.



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Warning

To prevent personal injury:

- Read all safety information before you use the Product.
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- Do not use the Product if it operates incorrectly.
- Do not use the Product if it is damaged.
- See emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.
- Do not disassemble the battery.
- Use only Fluke approved power adapters to charge the battery.
- Do not disassemble or crush battery cells and battery packs.
- Use only specified replacement parts.
- Have an approved technician repair the Product.

Section 3. Using the Community Thermal Imaging Camera

1. When borrowing the camera you will have

The Community Thermal Imaging Camera bag containing:

- The TiS105 Fluke Thermal Imaging Camera, with the camera's Wi-Fi / SD memory card,
- The charging cable for the camera,
- The USB SD card reader.

2. Getting started

- Please read the manufacturer's safety information (above) for the camera.
- To switch on: push and hold the green power button to the right of the camera screen.
- **Open the screen cover flap on the back of the camera.**
- Point the camera at the area you want to look at to see a thermal image.
- You will need to stand at least 1.2m from the area you wish to view. There is no facility to 'zoom' the image.
- Press the ↓ key to switch from visual to thermal, and combined visual/thermal modes.

3. Looking at the images on the camera

- The colour scale moves from blue being cold through red to yellow being hot.
- When viewing a property from inside; blue areas show cold air coming into a house and cold spots. When viewing a property from outside; yellow/red shows heat escaping.
- All is relative! Use the temperature scale on the side of the image to understand what you are seeing. You are looking for a big differential in temperatures in places where there shouldn't be a large difference. See Part B.
- The spot temperature shown on the screen relates to the small white target square in the middle of the screen.
- You will need to look obliquely at surfaces that reflect heat e.g., windows, pictures and other reflective surfaces as your own body heat will reflect off reflective surfaces, such as glass.
- The colour palate is set as "**ironbow**", it can however be changed to a variety of other colour scales (**press function button F2, then image, then palette**). Please reset it after you have finished.
- The camera can be used to observe your walls, ceiling etc. as you move around the house.
- To 'freeze' the image, pull the green trigger. (Pulling it again unfreezes it.)
- If you would like to save the images to look at after you have returned the camera, the next sections describe ways to do this.



4. Saving images, the easy way

- Simply take a photo of the camera screen(frozen) with your phone or iPad.

5. Taking and saving JPEG images to a memory card

- The camera has internal memory, however it is set up for you to save images onto the SD memory card supplied with it. (You may wish to use your own SD card, but please remember to return SSA's SD memory card before returning the camera!)
- To insert the Micro SD memory card, gently push the card into the slot on top of the camera (see diagram on page 4) until it catches.
- Check the picture will be saved to the SD card - **Press F2, then settings, then image storage to choose the SD card** if it is not already set to that. *It is important to select this before saving images.*
- To view the pictures later you will probably want them to be in a jpeg format. To check / change to JPEG settings **Press F2, then settings, then file format and select JPEG**

- You are then ready to take pictures.
- To capture an image, ***pull the green trigger on the back of the camera to 'freeze' it and then choose function button F1*** if you wish to save the image.
- To look at the pictures you have saved on the camera's screen, ***choose function button F2 and select memory***. Use arrow buttons to select a thumbnail image press F1 to view, or F2 to delete it
- To transfer the images, remove the SD card, insert it into the USB card reader supplied and then transfer the images to your laptop or PC.

6. Changing settings on the camera

- The (default) settings as they are work fine but if you want to alter the settings you need to press the F2 function button to see the menus. Remember, we do need the default settings back to where they were when you picked up the camera, so the next user does not have to readjust the settings.

The main default settings are:

- Image
 - Palette (Ironbow); IR-Fusion (Max IR); Colour Alarm (Off); Display (Display all); Alignment distance 1m; Thermal MSX
- Measurement
 - Range (auto Range); Emissivity 0.9; Background 15 degrees; Center Box (On)
- Temperature scale; Auto

7. How do I manually set the camera temperature range and why would I do this?

- The temperature range is set automatically to encompass the highest and lowest temperatures in your view but it can be adjusted manually.
- In some situations, the automatic temperature range represents an image with a very wide temperature range. Outside at night, the sky temperature may read down to minus 40 degrees. Inside a house, a working radiator would be very hot. This can prevent the camera from showing the more subtle temperature differences that you are looking for.
- You can concentrate the camera's temperature setting on a range of your choosing to block out that hot radiator or discount the cold night sky and therefore improve the thermo-image you are seeing.
- There's a **simple way** to select a preferred temperature range by pointing the camera at a view of objects within this range and holding down ***function button F1*** until **manual** is displayed above the temperature scale.
- Now **this** range keeps within the temperature limits whatever you view, until ***function button F1*** is held down again and the temperature range reverts to **auto**.
- Objects below the temperature range appear grey. Objects above the temperature range are green.
- The > arrow widens the span of the temperature range. The < arrow shrinks the span of the range. The 'up' arrow moves the entire fixed temperature range up by small increments (1 degree or less). It is easier to 'freeze' the image first before using the arrow buttons. We recommend practising first.
- There are full instructions on pages 23-25 of the Fluke Manual to do this.
- Please check that the temperature range is reset to AUTO before you return the camera.

Part B: What might the camera show me?

The camera can show you heat leaking from your house or cold air coming into your home. It can highlight

- draughts
- cold bridges
- inadequate insulation

Remember that you are looking for a significant temperature difference in an area where you wouldn't expect it. A few degrees difference may not be of concern despite a blue/yellow contrast on the camera. Always refer to the temperature scale on the side of the screen and take a common-sense approach.

Please note the images below are taken with a variety of cameras with different colour setups.

1. ROOFS, LOFT HATCHES AND LOFT INSULATION - around a quarter of heat is lost through the roof in an uninsulated home.

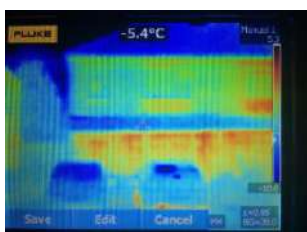


Figure 1 shows the outside of a semi-detached house with no heat escaping through the roof - a suitable level of insulation has been installed throughout the roof.

Heat is also lost from poorly insulated loft/ Ill-fitted loft hatches

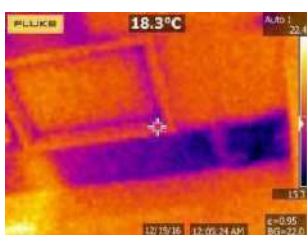


Figure 2 shows the impact of a partially uninsulated loft; also, the loft hatch would benefit from draught- excluding strip.

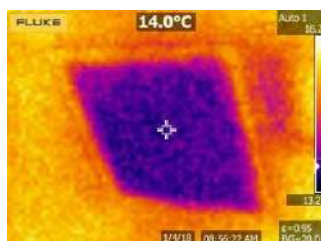


Figure 3 The dark area shows a loft hatch without insulation

2. WALLS - about a third of all the heat lost in an uninsulated home escapes through the walls

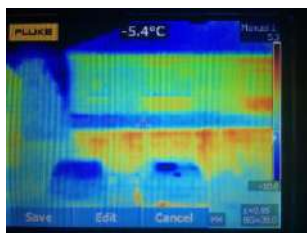


Figure 1 shows the front of a semi-detached house (which is a solid wall) with no insulation. You can see the heat clearly being lost in the lower half of the house (the warmest part of the house by far at the time).

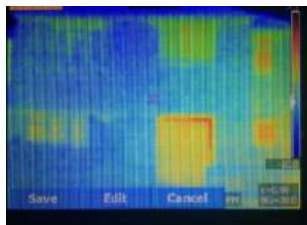


Figure 4 shows the rear of the house which has a cavity wall with cavity wall insulation installed. Here it's only the old windows/patio doors letting the heat escape! You can clearly see the difference from the front of the house (in Figure 1).

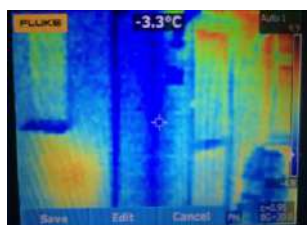
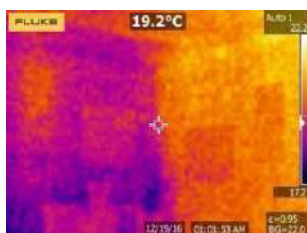


Figure 5 is an external view showing heat escaping through the house wall (no cavity wall) from a radiator. Reduce by insulating or fixing reflective foil to the wall behind the radiator.



In **Figure 6**, the wall on the left is an outside wall, and the wall on the right is an internal wall.

3. COLD BRIDGES



In a house with cavity wall insulation, you would be able to see whether the insulation went around the whole house or whether the cavity was built room by room with bricks going directly from outside to inside at the room junctions. If the cavity infilled with insulation did not go all the way round the outside of the house, there would effectively be a cold bridge where the bricks were crossing the cavity (see **Figure 7**).

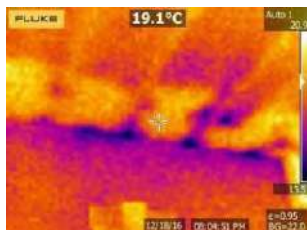


Figure 8 shows a garage conversion interior - the top of the wall (where the eaves are) is markedly colder, and there's patchy insulation in the ceiling.

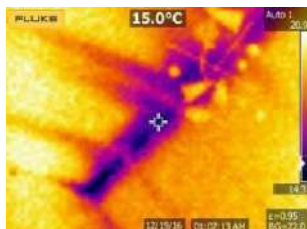


Figure 9 shows a bedroom roof apex is cold at the join of the two roof sections.

4. DOORS AND WINDOWS



Figure 10 shows areas where it would be helpful to seal between the window frames and the walls

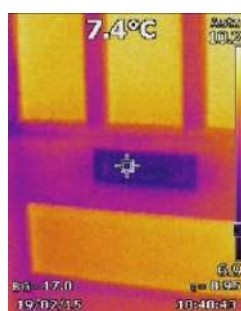
Heat loss from single glazed window (this image was taken from the inside)



In this image, **figure 11**, the dark areas show heat being lost through a single glazed window.

The temperature shown at the top of the camera image (10.3), is the temperature at the cross at the centre of the image.

The temperatures shown at the side (17.7 to 9.2) show the range of temperatures in the image.



Heat loss through the doors and heat leaking from letter boxes (this image was taken from outside).

The image, **figure 12**, taken from outside, shows a well-insulated letter box. It also highlights the heat loss from single glazed windows in the door.

5. FLOORBOARDS - Heat loss through the floor

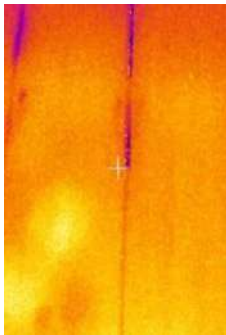
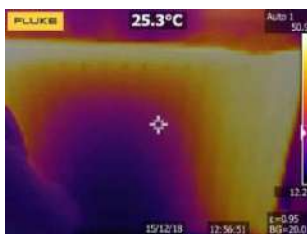


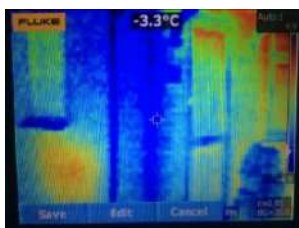
Figure 13 shows the gaps between floorboards, there is insulating tubing between the boards in the lower half of the picture but not the top part.

6. RADIATORS- that need flushing out or are heating the outside



Radiators that need flushing out

The dark area of **image 14** is where the water is not circulating in the radiator



Radiator heat leaking through the outside wall (bottom left of image)

The leakage could be reduced by insulation or a reflector behind the radiator (this **image 15** is taken from outside, in a different colour scheme)

7. UNDERFLOOR HEATING

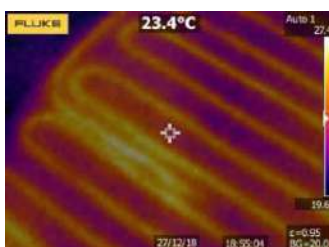


Figure 16, underfloor heating elements

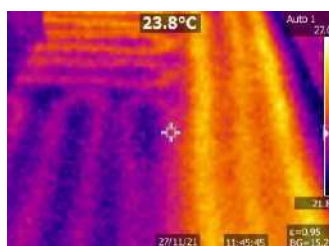


Figure 17 shows elements in one section that are not so hot.

8. OTHER

- a) **Areas that have not been plastered or had plasterboard fitted.** For example, in a conservatory you would see a difference in temperature between a breeze block wall and a wall with plasterboard.
- b) **Any gaps in the walls, roofs or floors that have not been sealed properly.** For example, around service ducts penetrating from inside to outside.

9. NOTES ON USING THE CAMERA OUTDOORS

- a) **Setting the camera's temperature range to manual is useful outside**

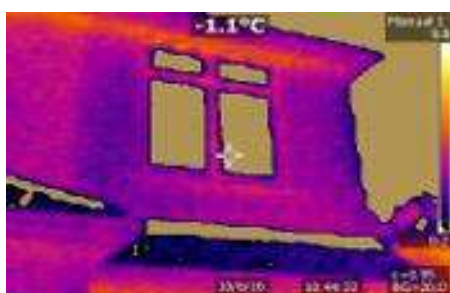


Figure 18 with temperature range set to Manual, to give better temperature definition for the house; The cold sky appears silver because it is below the minimum temperature of the range



Figure 19 was taken with the temperature range set to Auto, and the temperature definition for the house is worthless

- b) **The sun can affect the temperature of the outside of the house.**



There is a reflection of the much colder sky onto windows. This is particularly significant when the sky is clear.

The sun has warmed the brickwork all day, and it is quite warm when viewed with the camera at night even in winter.

Please send us your images!

If you have taken images that we could add to this guide or in case studies please do email them to us with a few words about the image at thermal.imaging@sustainablestalbens.org

Part C: What can I do to reduce the heat loss from my house?

Resources are regularly updated see <https://sustainablestalbans.org/efficient-buildings/>

Low or no cost ideas

1. Always close curtains and blinds at night, even in rooms you're not using, and open them during the day. If you have long curtains over a radiator, tuck the curtains behind the radiator or, better, shorten the curtains!
2. Consider foil behind radiators to reflect heat into the room.
3. Close the door on unused rooms to keep the heat where you need it.
4. Fill gaps in floorboards and skirting boards; use rugs or carpet where possible.
5. Install draft-proofing around doors, windows, and ducts.
6. Install a chimney balloon in chimneys that are not used and not required for ventilation.
7. Try to prevent those small draughts through letterboxes (fit a cover/brush), keyholes (fit a keyhole cover), cat flaps (fill with insulation or blanket flap) and loft-hatch (use draught proofing tape).
8. Download "Save Warm for Less" – for a compilation of Energy saving hacks for the home <https://ecorenovationhome.com/>
9. Look at the blogs on our website <https://sustainablestalbans.org/insulating-your-home/>

Higher cost ideas

1. Consider fitting blinds & curtains where they are not fitted, including over external doors.
2. Loft insulation: see Centre for Sustainable Energy, Loft insulation Guide, <https://www.cse.org.uk/advice/advice-and-support/loft-insulation>
3. Cavity wall insulation: see Centre for Sustainable Energy, Cavity wall insulation, <https://www.cse.org.uk/advice/advice-and-support/cavity-wall-insulation>
4. Look at secondary glazing, double glazing, or triple glazing.
5. External wall insulation.
6. Floor insulation.
7. Ventilation extracts with heat recovery or demand controlled ventilation.

Further information

1. DIY Draught Proofing Guide, Centre for Sustainable Energy, <https://www.cse.org.uk/advice/advice-and-support/diy-draught-proofing>
2. Draught Proofing Guide, Energy Savings Trust, <https://www.energysavingtrust.org.uk/home-insulation/draught-proofing>
3. Home Insulation, Energy Savings Trust, <https://www.energysavingtrust.org.uk/home-insulation>
4. Loft insulation, Guide Centre for Sustainable Energy, <https://www.cse.org.uk/advice/advice-and-support/loft-insulation>
5. Green our Herts: <http://greenourherts.org.uk/>
6. St Albans District Council also has useful advice at <https://www.stalbans.gov.uk/energy-efficiency>
7. See Beginner's Guide to EcoRenovation <https://ecorenovationhome.com/>
8. For any retrofit projects it is recommended to seek advice from a qualified professional. Any retrofit should follow the best-practice guidance provided in the latest PAS 2035.

Part D: Thermal Imaging Camera: Our Feedback Form

After using the camera, please complete our short feedback form online

at: <https://forms.gle/is1eqjyQxMn4r12x8>

We hope that you found it useful, interesting, and fun to use the Sustainable St Albans Thermal Imaging Camera. It would greatly help if you could complete the survey online (or you may complete the form below and leave it with the camera when you return it). The survey information enables us to improve the experience of future borrowers of the camera, to provide feedback to our funder and to assess the usefulness of the camera. Data used in reports will be anonymised.

1) Which camera did you borrow? St Albans/Harpenden/Community	
2) Date Camera Borrowed	
3) Date of your info/training session	
4) Did you find the thermal imaging camera useful?	not very useful 1 2 3 4 5 very useful (Please select)
5) Did you learn of anything particularly negative or positive about the heat loss from your house? If so, what?	
6) Will you be taking any action in the next 12 months with regard to any heat loss you found? If so, what?	
7) Did you find the information session helpful?	not very helpful 1 2 3 4 5 very helpful (Please select)
8) Did you find the video on using the camera helpful?	not very helpful 1 2 3 4 5 very helpful (Please select)
9) Did you find it easy to use, once you had read the instructions provided? If no, please explain	not very easy 1 2 3 4 5 very easy (Please select)
10) Did you take any images that you could share with us to develop the resources for borrowers?	No/Yes, I will email them to thermal.imaging@sustainablestalbans.org
11) Please add any further comments or suggestions. (Or email or continue on a separate sheet)	
12) Would you like to receive monthly newsletters from Sustainable St Albans? (Y / N)	If yes, please add your email address below

Please also consider donating towards the costs of running this project.

The loan of the camera is free for residents of St Albans District. However, Sustainable St Albans suggests a voluntary donation of £10 is made to help fund activities related to Sustainable St Albans's cameras.

Donations can be made by

- via our website <https://sustainablestalbans.org/donate/> Please use the reference "TiC Donation".
- **cheque** (to Sustainable St Albans) **or cash** (left with the camera when you return it)
- **bank transfer** (Sustainable St Albans; Sort Code: 08 92 99; Account No 65843671). Please use the
- reference "TiC Donation"

If you are a taxpayer and you complete the Gift Aid form in the Annex, we can also reclaim the tax on your donation.

Thank you.

Sustainable St Albans Thermal Imaging Camera Volunteers

Email: thermal.imaging@sustainablestalbans.org

Website: <https://sustainablestalbans.org/thermal-imaging/>



Part E: Procedures for collecting and returning the camera for winter 2025/6 and for payment of the security deposit.

Thermal Imaging Camera deposit options: The deposit may be paid by cheque or by card when you collect the camera (or if you prefer email us to pay in advance). Please make cheques payable to **Sustainable St Albans** and bring signature ID (e.g. driving licence).

Collecting the camera

1. Please arrive promptly. If you are unable to collect the camera, please inform us by emailing thermal.imaging@sustainablestalbans.org as soon as possible (please specify in the email whether you are contacting the Harpenden, St Albans or Community camera volunteers).
2. Bring address ID for the camera volunteer to check your name and address ID against the booking.

Using the camera

1. Please see **Part A sections 1, 2 or 3 of this guide**. Our website (<https://sustainablestalbans.org/thermal-imaging/>) provides links to our Information Session, the videos for the different cameras and to the manufacturers guides for more technical queries.
2. If you still have queries, please email thermal.imaging@sustainablestalbans.org (please specify in the email whether you are contacting the Harpenden, St Albans or Community camera volunteers).

Returning the camera

1. Please arrive promptly at the booked time. If for any reason you are unable to return the camera at the booked time please contact us immediately thermal.imaging@sustainablestalbans.org (please specify in the email whether you are contacting the Harpenden or St Albans volunteers).
2. The camera volunteer will check that the camera is in working order. If you provided the deposit by cheque, they would return this to you. Deposits paid electronically will be returned asap.

Terms of borrowing a Sustainable St Albans Thermal Imaging Camera

This is a copy of the terms signed when booking to borrow the camera.

The thermal imaging cameras are available for the district's residents to borrow to see where heat is leaking from their house. The cameras are expensive and sophisticated pieces of equipment and must be used with care according to the procedures below. The camera is the property of Sustainable St Albans.

I agree that:

1. I will follow the safety guidance provided (**see Part A sections 1, 2, or 3 for the different camera models**) including that related to the Community camera laser, where applicable.
2. I will not hold Sustainable St Albans or its volunteers responsible for any consequences of my use of the camera.
3. I will look after the camera, and I will not leave it unattended or in unlocked rooms or vehicles.
4. I will not use the camera in the rain, in direct sun or in strong winds.
5. I will provide a security deposit of £200 to Sustainable St Albans. The deposit will be returned when the camera package is confirmed to have been returned complete and undamaged
6. I agree that if the camera package is damaged in any way my deposit will be forfeited.
7. I will collect and return the camera at the agreed times.

The cameras are loaned out by our volunteers, I understand that it might occasionally be necessary for a booking to be cancelled. If this happens, we will contact you immediately to cancel and then in due course to rebook.

Sustainable St Albans Thermal Imaging Camera Volunteers

Email: thermal.imaging@sustainablestalbans.org

Website: <https://sustainablestalbans.org/thermal-imaging/>



Annex:

Please Gift Aid your donation to Sustainable St Albans

You can boost your donation by 25p of Gift Aid for every £1 you donate. Gift Aid is reclaimed by us from the tax you pay for the current tax year. We need your address to identify to HMRC that you are a current UK taxpayer. **In order to Gift Aid your donation please tick the boxes below:**

giftaid it

☐ I want to Gift Aid my donation of £_____ and any donations I make in the future or have made in the past 4 years to Sustainable St Albans.

☐ I am a UK taxpayer and understand that if I pay less Income Tax and/or Capital Gains Tax than the amount of Gift Aid claimed on all my donations in that tax year it is my responsibility to pay any difference.

Please complete your details

Title _____ First name or initial(s) _____

Surname _____

Full Home address _____

Postcode _____ Date _____

Please return your form to trustees@sustainablestalbens.org or the address below.

Please let us know if you:

- want to cancel this declaration.
- change your name or home address.
- no longer pay sufficient tax on your income and/or capital gains.

If you pay Income Tax at the higher or additional rate and want to receive the additional tax relief due to you, you must include all your Gift Aid donations on your Self-Assessment tax return or ask HM Revenue and Customs to adjust your tax code.



Sustainable St Albans is a registered charity, no. 1173118.

Registered address: 21 Marlborough Gate, St Albans AL1 3TX

For more information and to view our Data Protection Policy, see www.sustainablestalbens.org