

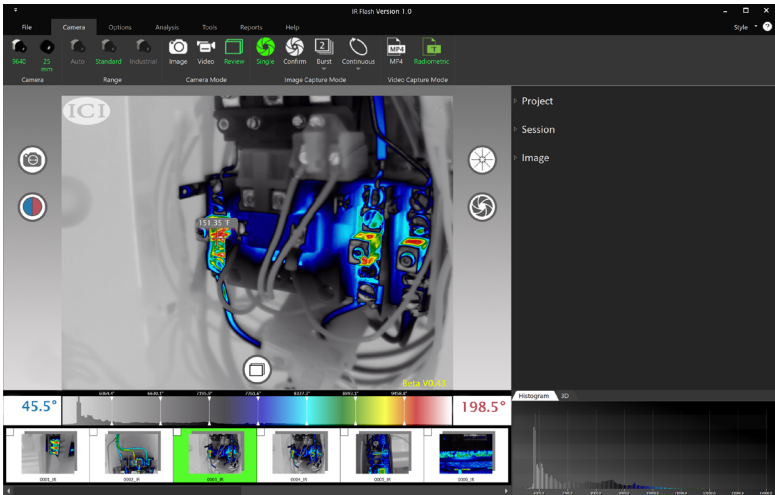


IR FLASH PRO

PROFESSIONAL THERMAL IMAGE ANALYSIS SOFTWARE

USER MANUAL VERSION 2.2

PLEASE READ THIS MANUAL BEFORE LAUNCHING THE SOFTWARE.
IMPORTANT SAFETY INFORMATION INSIDE.



ICI cameras fall under US Federal Law and Export Control.

Revision History

04.2021-001	Document created
05.2021-001	Export information and legal terminology updated
07.2022-001	Bug fixes and added features. Removed support for FM and FM Plus series Cameras.
07.2022-002	Series of updates: <ul style="list-style-type: none"> • Added support for Helios cores • Added support for Titan cores • Added support for T-Cam images stored with voice annotations • Added support for APEX 200 • Added support for Smart IR • Added setting to export MP4 with ROIs, hot/cold spots, and timestamps • Added image enhancement filter • Added Delta T between ROIs
10.2022-001	Added Guided Session information and updated troubleshooting
10.2022-002	Updated the System Requirements
11.2022-001	Updated the Annotations section
01.2023-001	Added sections for Temperature Alarms, Data Recording, Modbus, and DDE settings
04.2023-001	Series of updates: <ul style="list-style-type: none"> • Added support for FMX400/700 Industrial cameras • Added support for Helios 640 and Titan 1280 cameras • Added support for SWIR cameras • Added support for FM cameras • Added support for TDLAS with FTDI chip • Added Multi-cam mode • Added support to run a search of connected cameras • Added support to save and load settings • Added support for different subscription levels • Added Asset ID and Asset Name • Added inverted color palette option • Added the ability to delete logs after x number of days based on the registry setting: default is 14 days • Added restart software if the program crashes • Added send data to monitoring application • Added disconnect message to the monitoring application • Added a Test connection for Email settings • Decreased software load time. • Support for old IR Flash and IR Flash Medical Tiff images • Removed camera dependencies • Various UI updates • Bug fixes

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1. Disclaimers

1-1 Terms and Conditions

Warranty Terms and Condition of Sale are made available online at:

<https://infraredcameras.com/support/terms-and-conditions-of-sale/>

1-2 U.S. Government Regulations

This product may be subject to U.S. Export Regulations. Please send any inquiries to support@infraredcameras.com

1-3 Copyright

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The documentation must not, in whole or part, be copied, photocopied, reproduced, translated or transmitted to any electronic medium or machine readable form without prior consent, in writing, from Infrared Cameras, Inc.

Names and marks appearing on the products herein are either registered trademarks or trademarks of Infrared Cameras, Inc. and/or its subsidiaries. All other trademarks, trade names or company names referenced herein are used for identification only and are the property of their respective owners.

1-4 Quality Assurance

Infrared Cameras, Inc. is committed to a policy of continuous development; therefore we reserve the right to make changes and improvements on any of the products without prior notice.

1-5 Customer Help

For customer help, visit:

<https://infraredcameras.com/support/>

E-mail:

support@infraredcameras.com

2. User Notice

2-1 Software Updates

Annual updates to the software is recommended. Contact customer service to schedule maintenance.

2-2 Accuracy

For very accurate results, we recommend that you wait a minimum of 5 minutes after you have started the software before measuring a temperature.

2-3 Cybersecurity

After the products are connected to the Internet, they may face risks including but not limited to network attacks, hacker attacks, virus infections, etc. The company will not be responsible for the abnormal operation of the products and any loss or liability caused therefrom shall be at your own risk.

2-4 Third-party Licenses

Information about third-party licenses is available in the user interface of the product.

2-5 Additional License Information

This software is sold under a single user license. This license permits the user to install and use the software on any compatible computer provided the software is used on only one computer at a time. One (1) back-up copy of the software may also be made for archive purposes

2-6 Usage Statistics

Infrared Cameras, Inc. reserves the right to gather anonymous usage statistics to help maintain and improve the quality of our software and services.

2-7 Intended Use

IR Flash Pro is a professional software used to capture infrared images and videos for thermal analysis. The software has features for correcting radiometric data and imaging parameters.

Environment of use: industrial and petrochemical buildings, electrical plants, security rooms, science labs, animal reserves as well as environmental conservatories, and aerial integrations, among others.

You agree that this product is for civilian use only, and shall not use applications that may infringe the rights of third parties, medical and safety devices or other applications where product failure may lead to life-threatening or personal injury, as well as weapons of mass destruction, chemical and biological weapons, nuclear explosions, unsafe use of nuclear energy, dangerous or humanitarian purposes. Any loss or liability caused therefrom shall be at the your own risk.

2-8 Manual Update

The user manual will be updated from time to time. To access the latest manuals, translations of manuals, and notifications, go to:

<https://infraredcameras.com/product-resources/>

The manufacturer reserves the right to alter the specifications of the product without prior notification. The manufacturer allows himself the right to modify without any preliminary opinion the technical specifications of the product.

2-9 Scope of Application

Infrared Cameras, Inc. issues generic manuals that cover several software versions.

This means that this manual may contain descriptions and explanations that do not apply to your particular software version. This manual may contain technical inaccuracies or typographical errors.

2-10 Authoritative Versions

The authoritative version of this publication is English. In the event of divergences due to translation errors, the English text has precedence.

Any late changes are first implemented in English. Other languages may or may not be available.

2-11 Training

To read about infrared training, visit:

<https://infraredtraininginstitute.com/>

3. Safety Information

- Do not attempt to install the software without following the installation instructions provided in this manual. Improper installation may cause the program to become unresponsive, crash, or not function properly.
- User must not tamper with files or alter the program in any way. Altering the program may cause the software to become unresponsive, crash, or not function properly.
- Any software application provided in this package is provided “as is” without warranty of any kind, expressed or implied. The entire risk lies with the user for the accuracy and performance of the program.
- The camera is controlled by the software application and should never be unplugged from the computer while the software is running. The user should exit the software program normally before the camera is unplugged. This safely shuts the camera down. Failure to follow this process may result in the need for the manufacturer to re-calibrate the camera system. Failure to adhere to this tenant may void the camera warranty.
- It is the responsibility of the user to obtain proper training in the use of the camera for their particular application including a working knowledge and understanding of any inaccuracy that is typically attributed to radiometric measurements.
- The software package is self-contained and requires no maintenance beyond maintaining the viability of the machine on which it resides, etc. Future updates for the software may or may not be made available to users at ICI's discretion.
- We suggest the user thoroughly read this manual before calling for assistance.
- Infrared Cameras, Inc. reserves the right to determine, at its sole discretion, the extent of user support made available to any user who ignores safety information or violates the Terms and Condition of Sale delivered in writing at time of purchase. The Terms and Condition of Sale are made available online at:

<https://infraredcameras.com/support/terms-and-conditions-of-sale/>

4. System Requirements

Documentation can be found online on the IR Flash Pro web page under the Downloads section or at this address:

<https://infraredcameras.com/ir-flash-pro-manual/>

4-1 Recommended System Requirements

Processor: Intel i5 Quad core or above

RAM: 4 GB or above

OS: Windows 8/8.1/10

Hard Drive: 256 GB or above

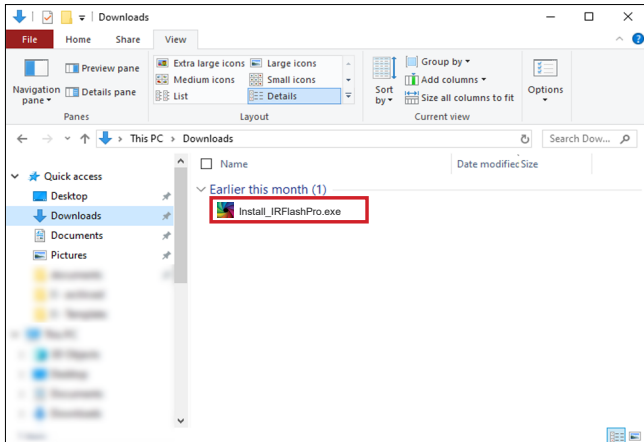
Resolution: 1920 × 1080

SOFTWARE DISPLAYS BEST ON A 1920 X 1080 DISPLAY.

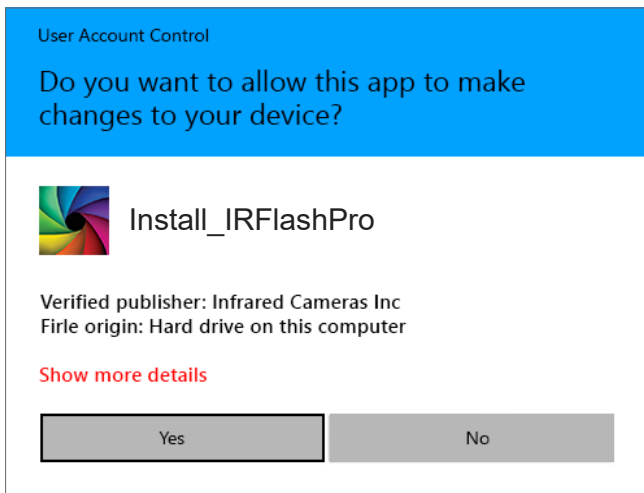
5. Installation

IR Flash Pro software should be provided on a USB drive. If a USB is not available, users can obtain a download link from customer support.

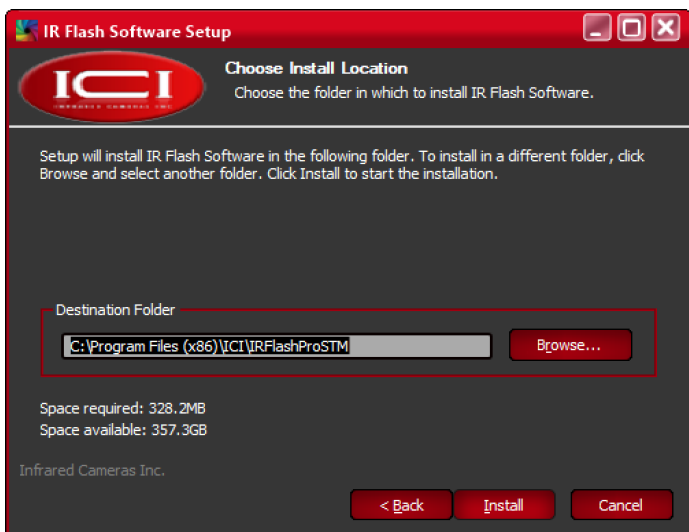
1. Insert the Software USB Drive into an available USB slot and launch .exe by double-clicking file.



2. Grant system permission. Click Yes if you agree to continue software installation.

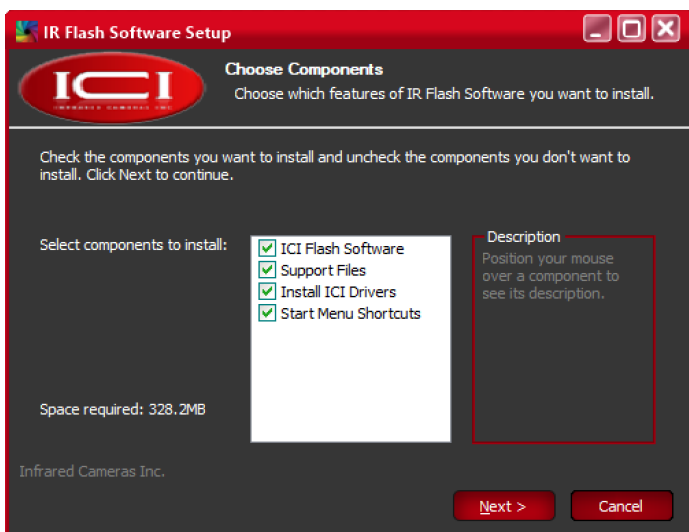


- Optionally change installation location by clicking Browse. Click Install.

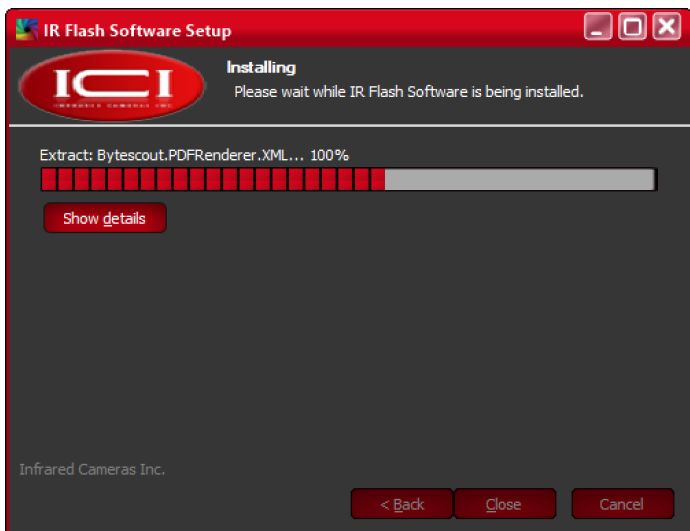


SOFTWARE INSTALLATION IS REQUIRED FOR IR FLASH TO WORK CORRECTLY. IT IS BEST TO INSTALL ALL COMPONENTS FOR PROPER SOFTWARE FUNCTIONALITY AND EASE OF USE. FAILING TO INSTALL DRIVERS MAY CAUSE SOFTWARE TO WORK IMPROPERLY OR NOT AT ALL.

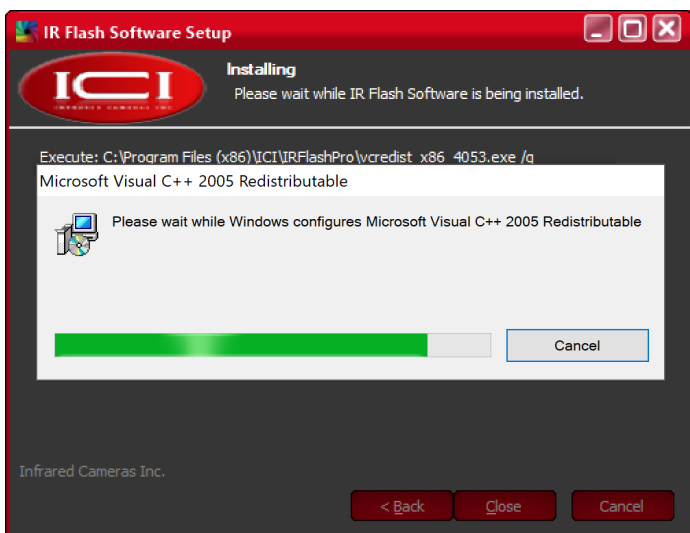
- Choose components. Click Next.



- Please wait while IR Flash software installs. Pop-ups occur. Do NOT close or cancel.

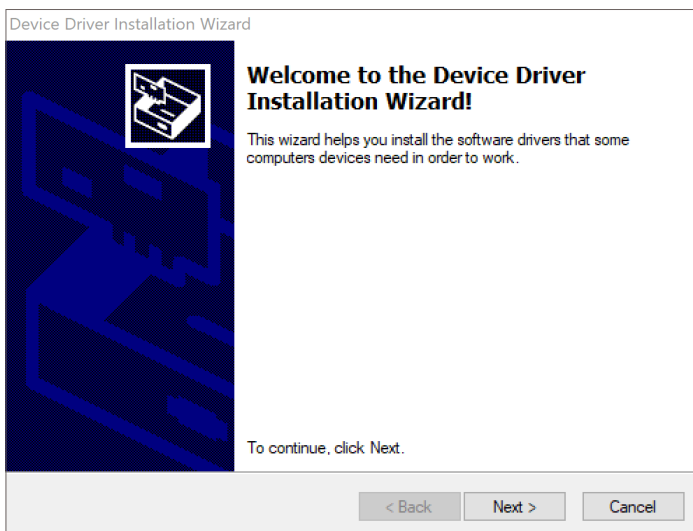


- Please wait while C++ configures. Pop-ups may occur. Do NOT close or cancel Redistributables.

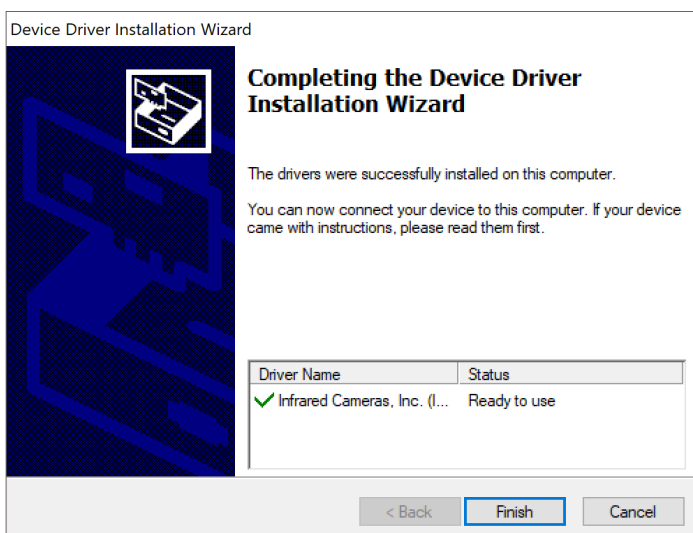


**MORE THAN ONE DRIVER MAY NEED TO BE INSTALLED.
REPEAT STEPS 7 AND 8 AS REQUIRED.**

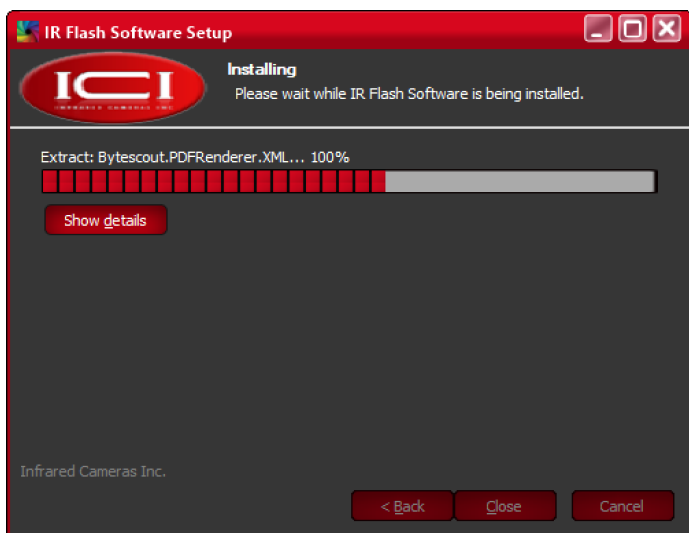
7. Device Driver Installation Wizard opens. To continue with installation, click Next.



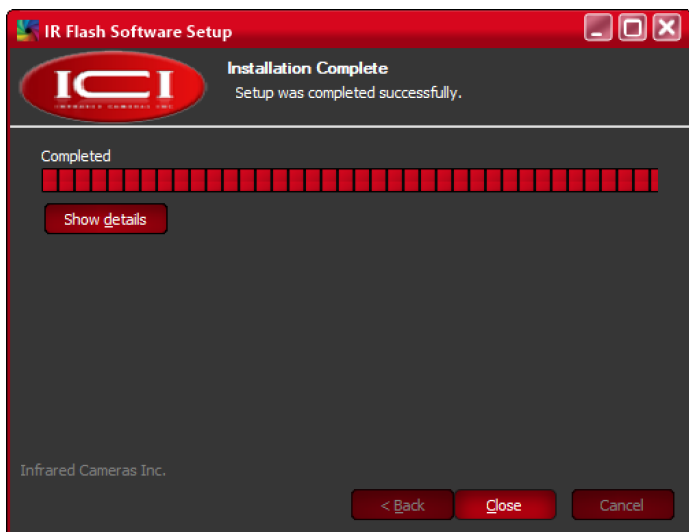
8. Click Finish.



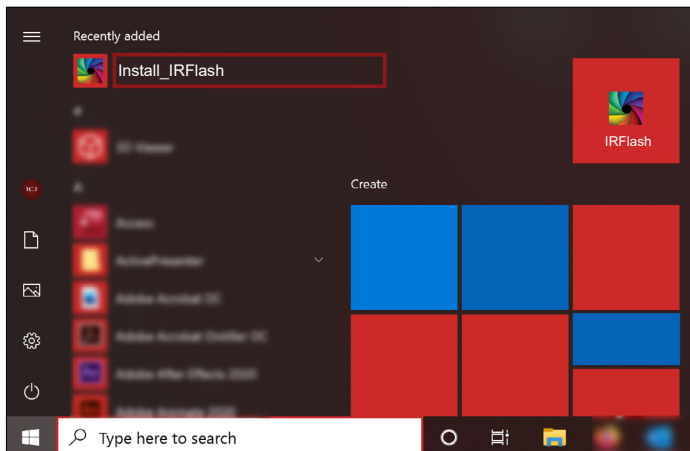
9. Allow IR Flash software to finish installing.



10. Click Close.



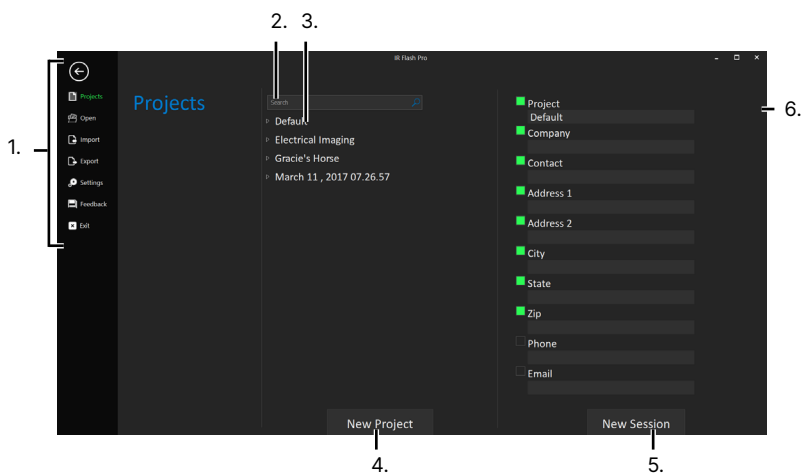
11. Launch IR Flash from the start menu or the desktop icon.



6. Projects Screen

6-1 Projects Screen Interface

IR Flash Pro's Projects Screen allows users to start new projects and sessions, import and export sessions, change settings, and offer valuable feedback.



1. Projects Menu

2. Search Bar

3. Projects List

4. New Project

5. New Session

6. Session Information

7. Getting Started

7-1 File Options

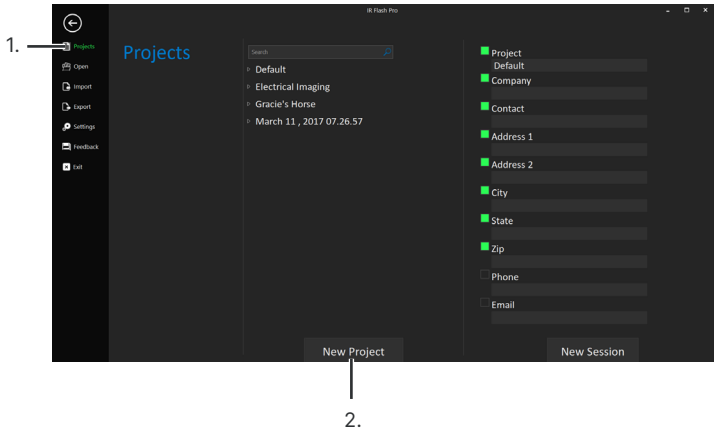
There are several options for opening and importing previous sessions as well as starting new projects and sessions. Users may also choose to export sessions. The software automatically knows if the user is loading a single image or a series of images.

7-1-1 Create a New Project

Projects are folders that hold sessions to assist users in staying organized. Create a New Project as follows:

1. Click Projects from the Projects Menu.
2. Click New Project. A new project folder is created named Project #. To rename the project see Section 7-1-7 Delete or Rename a Session or Project.

The user is now ready to start a new session. If the user has completed the above steps skip to Section 7-1-2 Start a New Session, Step 3; if the user has not completed the above steps start at the beginning of Section 7-1-2 Start a New Session.



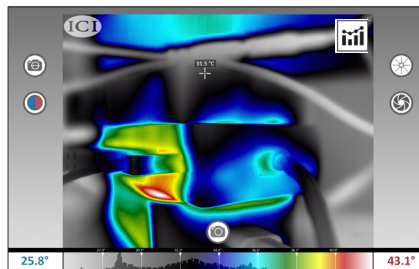
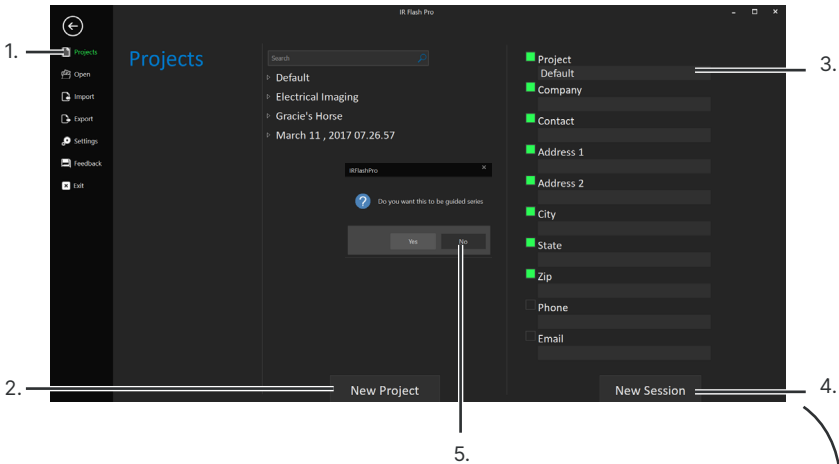
PROJECTS AND SESSIONS CAN ALSO BE MANAGED IN TOUCH MODE BY RIGHT-CLICKING ON THE IMAGE DISPLAY WINDOW AND VISITING THE FILE TAB (SEE CHAPTER 8 TOUCH MODE BASICS).

7-1-2 Start a New Session

Sessions break projects into manageable sections. This is useful for a thermographer who is capturing images of several objects at one location or imaging multiple locations on the same day. Start a New Session from scratch as follows:

1. Click Projects from the Projects Menu.
2. Click New Project. A new project folder is created named Project #. To rename the project see [Section 7-1-7 Delete or Rename a Session or Project](#).
3. (Optional) Fill in the session information. Filling in Session Information is not required but helps users stay organized when creating many sessions occurring on the same day or at the same location.
4. Click New Session.
5. Click Yes for a guided session or No for an unguided session. Guided sessions allow users to overlay a new session over a previous session. For more information regarding guided sessions see [Section 7-1-3 Start a Guided Session](#).

The Projects Screen switches over to the Touch Mode interface allowing the user to begin their session.



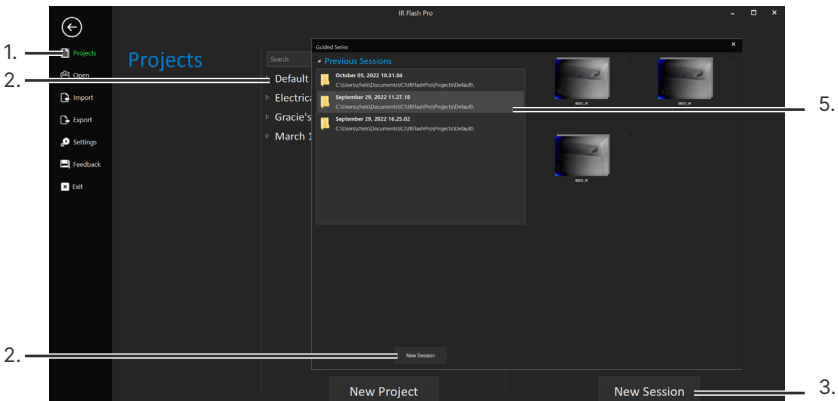
7-1-3 Start a Guided Session

Guided sessions allow users to overlay a new session over a previous session in order to compare trends over time. This feature is useful for tracking equipment degradation, studying environmental phenomena, monitoring changes in surface temperatures, among other applications.

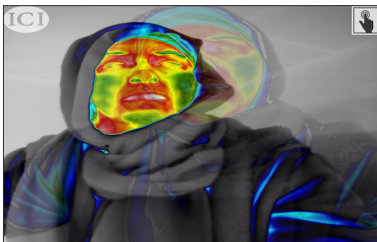
The software must load an existing session in order in order to perform a guided session. See Section 7-1-2 Start a New Session in order to perform the initial inspection.

Start a guided session as follows:

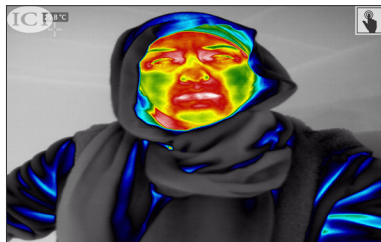
1. Click Projects from the Projects Menu.
2. Create a new project or select an existing project.
3. Click New Session.
4. Click Yes for a guided session.
5. Use the window to select a previous session.
6. Click New Session. The Projects Screen switches over to the Research Mode interface allowing the user to begin their guided session.
7. The user should align the subject to the guided overlay markers on the screen before beginning the inspection.



Non-aligned Image



Aligned Image

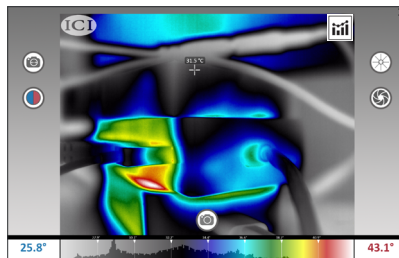
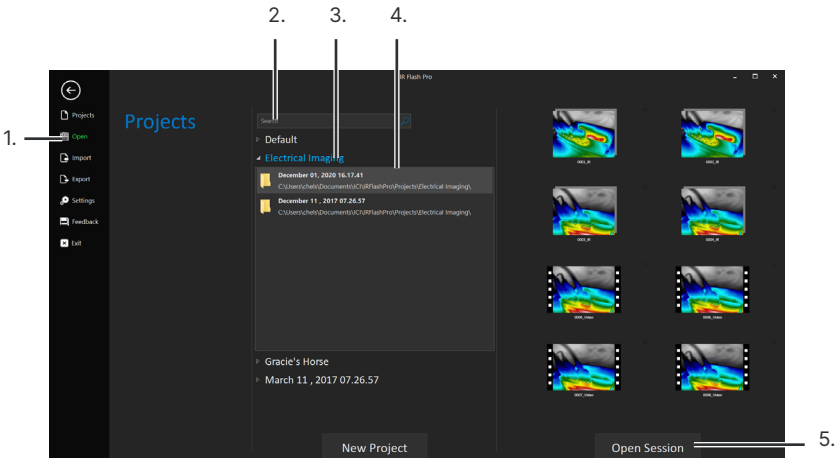


7-1-4 Open a Previous Session

Previous sessions are stored within the program's Projects List. The convenient Search Bar allows users to search for and load previously saved projects quickly for further analysis or report building. The search function only searches project names not session names. Load a session as follows:

1. Click Open from the Projects Menu.
2. Find or search for preferred project.
3. Click project name. A drop-down menu appears showing sessions.
4. Select preferred Session.
5. Click Open Session.

The Projects Screen switches over to the Touch Mode interface allowing the user to continue the previous session or make changes.



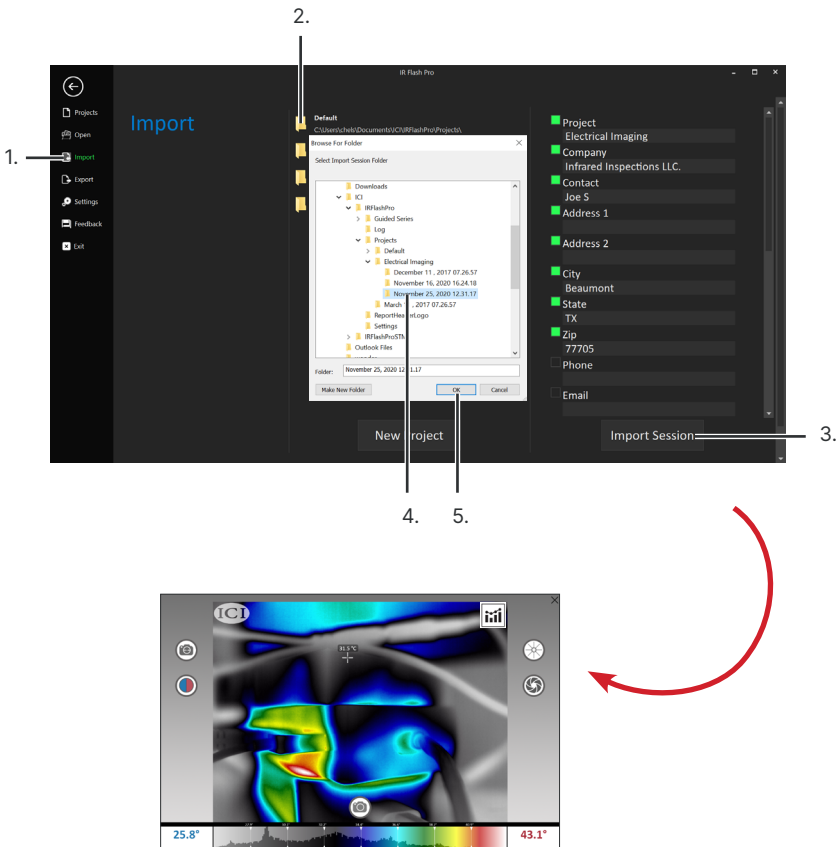
THE SEARCH FUNCTION CAN ONLY SEARCH PROJECT NAMES AND CANNOT SEARCH SESSION NAMES.

7-1-5 Import a New Session

Users can import sessions into projects as follows:

1. Click Import from the Projects Menu.
2. Select Project.
3. Click Import Session. A new window opens.
4. Browse for session.
5. Select session by clicking on its folder.
6. Click OK.

The Projects Screen switches over to the Touch Mode interface allowing the user to begin or edit their session.



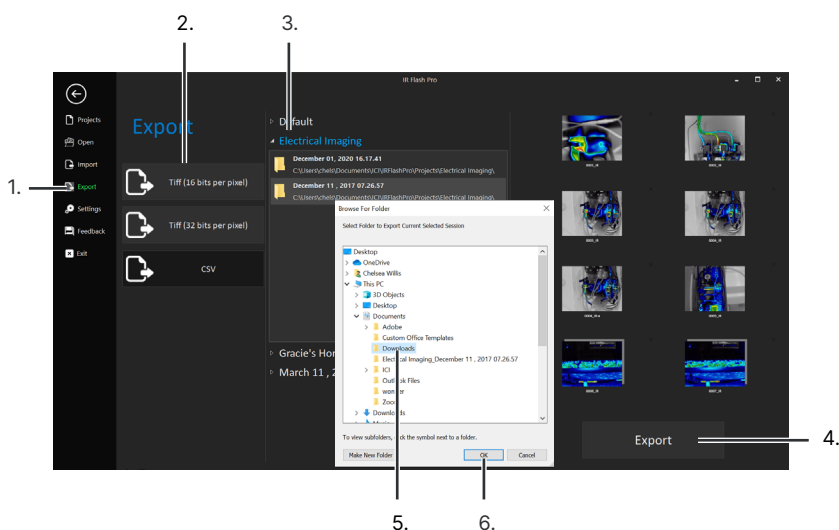
USERS CAN ONLY IMPORT ONE SESSION AT A TIME.

7-1-6 Export a Session

Users can export sessions in either TIFF (16 or 32 bits per pixel) or CSV format as follows:

1. Click Export from the Projects Menu.
2. Select the preferred export format.
3. Select Project.
4. Click Export. A new window opens.
5. Browse for export location.
6. Click OK.

IR Flash Pro exports the project in the preferred format.



PROJECTS AND SESSIONS CAN BE MANAGED WITHIN TOUCH MODE BY RIGHT-CLICKING ON THE IMAGE DISPLAY WINDOW AND VISITING THE FILE TAB (SEE CHAPTER 9 SETTINGS MENU).

7-1-7 Delete or Rename a Session or Project

Projects and Sessions can be created directly in IR Flash Pro but they cannot be deleted or renamed from Projects Screen. Projects and sessions can be managed within Touch Mode by right-clicking on the Image Display Window and visiting the File tab (see [Chapter 9 Settings Menu](#)). For touchscreens, touch and hold until a box pops up; then, release hold.

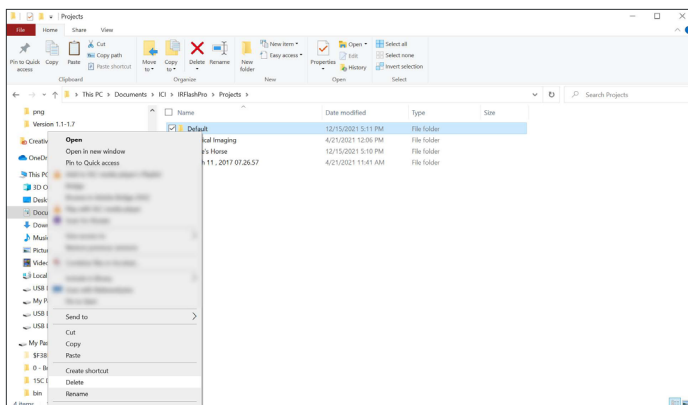
Users can also manage projects outside of IR Flash Pro using the File Explorer.

7-1-7-1 Manually Delete a Session or Project

1. Find the save location using the File Explorer.
2. Right-click on the project or session folder. A drop-down menu appears. For touchscreens, touch and hold until a box pops up; then, release hold.
3. Click Delete.

7-1-7-2 Manually Rename a Session or Project

1. Find the save location using the File Explorer.
2. Right-click on the project or session folder. A drop-down menu appears. For touchscreens, touch and hold until a box pops up; then, release hold.
3. Click Rename.
4. Type the new name into the input field.
5. Click anywhere off the folder to confirm changes.

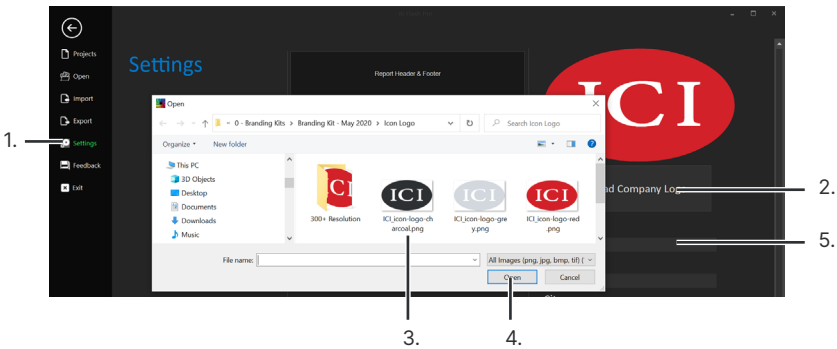


7-2 Settings Options

7-2-1 Report Header and Footer

IR Flash Pro allows users to select a company logo and enter company information for branding reports. Select an image as follows:

1. Click Settings from the Projects Menu. The Report Header & Footer section is selected by default.
2. Click Load Company Logo.
3. Browse to locate file.
4. Click Open.
5. Enter company information. Saving occurs automatically.



7-2-2 Loading and Saving

7-2-2-1 Choosing a Save Location

IR Flash Pro allows users to select a default save location for projects and sessions. Choose a new save location as follows:

1. Click Settings from the Projects Menu.
2. Click Loading & Saving.
3. Click Select Path.
4. Browse to find save location.
5. Click Save.

Once chosen, projects are automatically saved to the new location. Sessions are saved in their respective project folder.

7-2-2-2 Resetting the Save Location

If for some reason the user needs to reset the save location simply type the default save location into the input box. The default save location is:

C:\Users\XYZ\Documents\ICI\IRFlashPro\Projects

Where "XYZ" is the name of the user profile that has permission to run the program.

7-2-2-3 Finding the Save Location

Users may find the save location for a project in the Projects/Zones Area after creating a new project session or opening a previous project session in Research Mode (see Chapter 13 Research Mode). Click the Find icon located under the Project tab and the file explorer opens the location.



7-2-2-4 Convert Radiometric Videos to MP4 on Import

This process preserves the radiometric video and makes an MP4 copy without radiometric data. This feature is useful for performance and emailing files however radiometric data cannot be added back to the MP4 videos.

Enable automatic conversion of radiometric videos to MP4s on import as follows:

1. Click Settings from the Projects Menu.
2. Click Loading & Saving.
3. Click the check box next to On Import. The feature only works for videos. Disable the feature by clicking the box again.

7-2-2-5 Add a Timestamp on Conversion

The user can opt to add a timestamp when converting media to MP4 videos. This feature is useful for knowing the date and time of media capture.

Enable timestamps on media conversion as follows:

1. Click Settings from the Projects Menu.
2. Click Loading & Saving.
3. Click the check box next to Add Timestamp. The feature works for video and image conversion. Disable the feature by clicking the box again.
4. Convert preferred media (see Section 7-2-2-3 Convert Radiometric Videos to MP4 on Import, Section 11-4-1 Video Conversion, Section 13-5-1 Video Conversion, and Section 13-5-2 Image Conversion).

7-2-2-6 Add ROI Data on Conversion

By default ROI (Region of Interest) data is not added to MP4 media conversions. Users can enable and add ROI data to media conversions in the settings menu. This feature is useful for annotating radiometric data wherever an ROI has been created. Data includes minimum, average, and maximum temperature values.

Enable and add ROI data on media conversion as follows:

1. Click Settings from the Projects Menu.
2. Click Loading & Saving.
3. Click the check box next to Add ROIs. The feature works for video and image conversion. Disable the feature by clicking the box again.
4. Convert preferred media (see Section 7-2-2-3 Convert Radiometric Videos to MP4 on Import, Section 11-4-1 Video Conversion, Section 13-5-1 Video Conversion, and Section 13-5-2 Image Conversion).

7-2-2-7 Add Hot/Cold Spots on Conversion

By default hot/cold spot data is not added to MP4 media conversions. Users can enable and add hot/cold spot data to media conversions in the settings menu. This feature is useful for annotating hot/cold spot radiometric data wherever a hot/cold spot has been created. Data includes the hottest and coldest temperature values.

Enable and add hot/cold spot data on media conversion as follows:

1. Click Settings from the Projects Menu.
2. Click Loading & Saving.
3. Click the check box next to Add Hot/Cold Spots. The feature works for video and image conversion. Disable the feature by clicking the box again.
4. Convert preferred media (see Section 7-2-2-3 Convert Radiometric Videos to MP4 on Import, Section 11-4-1 Video Conversion, Section 13-5-1 Video Conversion, and Section 13-5-2 Image Conversion).

7-2-2-8 Display Touch Mode on Startup

Users can have IR Flash Pro launch in Touch Mode instead of the Projects Screen as follows:

1. Click Settings from the Projects Menu.
2. Click Loading & Saving.
3. Click the check box next to Display Touch Mode on Startup. Disable the feature by clicking the box again.

7-2-3 Email Settings

This section allows users to give feedback in the form of an email (Internet required). Give feedback or report a bug as follows:

1. Click Settings from the Projects Menu.
2. Click Email Settings.
3. Enter SMTP information.
4. Click Yes or No for Encryption.
5. Enter User Name.
6. Enter password.

Email settings are saved automatically.



7-2-3-1 Test Email Connection

This section allows users to give feedback in the form of an email (Internet required). Give feedback or report a bug as follows:

1. Click Settings from the Projects Menu.
2. Click Email Settings.
3. Enter SMTP information.
4. Click Yes or No for Encryption.
5. Enter User Name.
6. Enter password.
7. Click Test Connection.

Email settings are saved automatically.

7-3 Feedback

This section allows users to give feedback in the form of an email (Internet required). Give feedback or report a bug as follows:

1. Click Feedback from the Projects Menu.
2. Fill in information.
3. Click Send.

7-4 Exit

Clicking the Exit button executes a shut down of the program. Exiting the software takes several seconds.

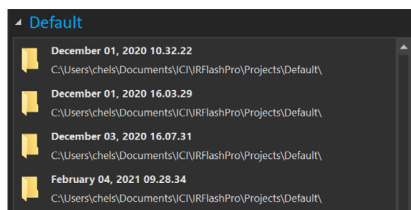
7-5 Auto Session/ Return to Image Display Window


The arrow in the upper left-hand corner serves two purposes: auto starting a session and returning to the Image Display Window.

7-5-1 Auto Start a Session

Users who are imaging one subject or one location can opt to automatically begin a new session in the Default project folder without adding Session Information. This allows users to begin inspections immediately but limits the users ability to stay organized. Filling in Session Information is not required but helps users when creating many sessions occurring on the same day or at the same location.

New sessions are named by date and a series of auto-generated numbers by default:



To auto start a session click the  in the upper left-hand corner. The Projects Screen switches over to the Touch Mode interface allowing the user start the session.

7-5-2 Switch between the Display Window and Projects Screen

Once a new project has been created and a new session started, IR Flash Pro launches in Touch Mode, a full screen experience for rapid image capturing. For in-depth analysis and report building enter Research Mode by clicking the icon in the upper-right hand corner of the Image Display Window (see [Chapter 12 Switching between Interface Modes](#)).

Research Mode



Touch Mode



7-5-2-1 Open the Projects Screen

To return to the Projects Screen from Research Mode, click File from the Main Menu. Users cannot return to the Projects Screen from Touch Mode without first entering Research Mode.

Return to the Projects Screen from Touch Mode as follows:

1. Click the Research Mode icon in the upper-right hand corner of the Image Display Window.
2. Click File from the Main Menu to open the Projects Screen.

USERS CAN RETURN TO TOUCH MODE BY PRESSING THE TOUCH MODE ICON.

7-5-2-2 Return to the Image Display Window

To return to the Image Display Window:

1. Click the  button in the upper left-hand corner.

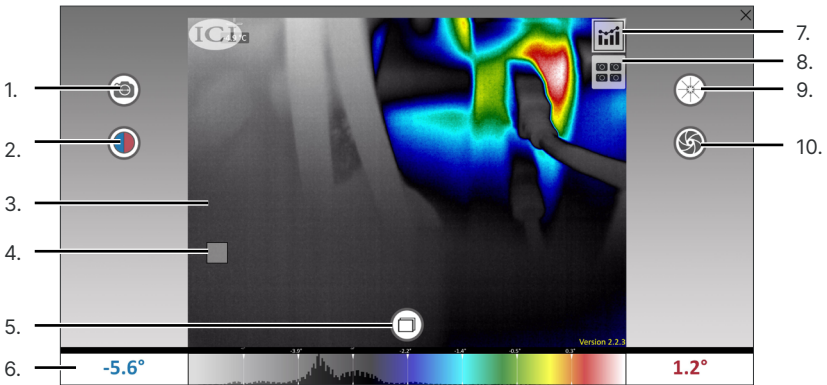
The interface switches to Research Mode. Click the Touch Mode icon to enter Touch Mode for rapid image capture or stay in Research Mode to perform analysis and build reports.

8. Touch Mode Basics

Once a new project has been created and a new session started, IR Flash Pro launches in Touch Mode, a full screen experience for rapid image capturing. For in-depth analysis and report building enter Research Mode by clicking the icon in the upper-right hand corner of the Image Display Window (see Chapter 12 Switching between Interface Modes).

8-1 User Interface

There are significantly less features available while in Touch Mode as compared to Research Mode (see Chapter 13 Research Mode).



- | | |
|---|-------------------------------------|
| 1. Select Mode Function | 6. Level & Span Histogram |
| 2. AGC/Level & Span | 7. Research Mode (see Chapter 13) * |
| 3. Image Display Window | 8. Multi-cam Mode |
| 4. Settings Menu (right-click on desktop or for touch devices press and hold, then release) | 9. Non-Uniformity Correction (NUC) |
| 5. Camera Mode | 10. Capture * |

* **CLICKING THE ICON IN THE UPPER-RIGHT HAND CORNER TAKES THE USER TO RESEARCH MODE.**

+ **THE CAPTURE BUTTON APPEARS DIFFERENTLY DEPENDING ON THE SELECTED CAMERA MODE AND IMAGE CAPTURE MODE SETTINGS.**

8-2 Image Display Window

Digital and thermal images are streamed and displayed in the Image Display Window. If the thermographer is using a system with both thermal and visible cameras, e.g. IR-Pad, they can switch between IR and digital feeds using the Select Mode Function (see Section 8-4 Select Mode Function).

The Image Display Window is utilized when thermographers need to review captured images and videos (see Section 8-10 Review Images/Videos in Touch Mode and 13-2-6 Review Images/Videos in Research Mode).

While in Touch Mode, users can right-click on the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold. This menu offers users another way to access the Main Menu and Sub-menus available in Research Mode (see Chapter 9 Settings Menu).

WHEN USING THE IR-PAD SERIES DEVICES, USERS SHOULD START A NEW SESSION, LOAD A PREVIOUS SESSION, OR HAVE A THERMAL CAMERA RUNNING WHEN STARTING A NEW SESSION. IF A SESSION IS NOT LOADED OR IF THERE IS NOT A THERMAL CAMERA DETECTED THE SOFTWARE DISPLAYS THE LIVE FEED FROM THE VISUAL CAMERA BUILT INTO THE DEVICE.

8-3 Non-Uniformity Correction (NUC)

A Non-Uniformity Correction (NUC) sets all pixels in the infrared camera to the same average reading. Most IR devices offered by ICI have an internal shutter that automatically performs a NUC operation every 3 minutes. Users can manually trigger the internal correction by clicking the NUC button:



Some cameras may need to have the lens cap placed on or to be looking at a surface with a consistent temperature, e.g. face-down on a table or against a solid surface in order to perform a non-uniformity correction.

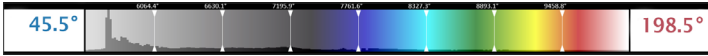
8-4 Select Mode Function

The Select Mode Function allows users to switch between visible and infrared feeds. Users may find switching back-and-forth between feeds useful in keeping situational awareness or locating areas of interest. Simply click the Select Mode button, seen below, once to change modes. Click again to switch back.



8-5 Level & Span Histogram

Below the Image Display Window is the Level & Span Histogram which plots the surface temperature information detected by the system. The minimum temperature is displayed on the left and the maximum temperature on the right.



Preferably, any temperature detected by the thermal device falls between these two numbers on the histogram; if a number falls outside this range the image may “wash out”, i.e. the extraneous energy in the viewing environment may reduce the perceived contrast of an image. Adjust the numbers to improve contrast (see Section 8-6 AGC and Manual Level & Span Adjustment).

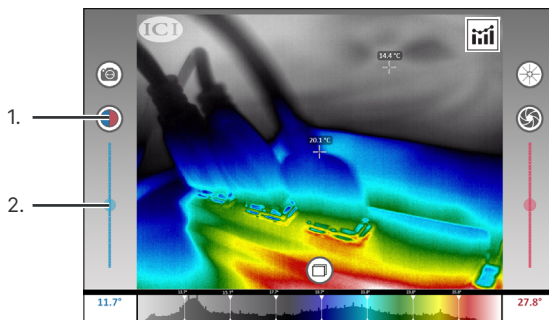
8-6 AGC and Manual Level & Span Adjustment

The Auto Gain Control (AGC) function is enabled by default and automatically assists users in fine-tuning image contrast. If disabled, the Level & Span control sliders are activated. The user gains complete control of contrast gain settings. To disable AGC and enable the Level & Span control sliders click the AGC/Level & Span button seen below. To enable AGC and turn off the sliders click the button a second time.



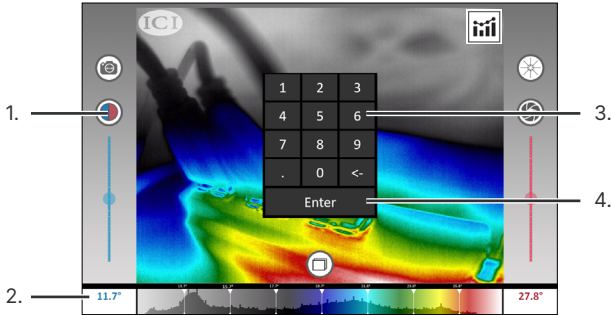
8-6-1 Manually Adjusting AGC/Level & Span Method 1

1. Click the AGC/Level & Span button to deactivate Auto Gain Control. The blue and fuchsia Level & Span control sliders appear for setting Min and Max values.
2. Adjust the sliders up or down until the preferred contrast is obtained.



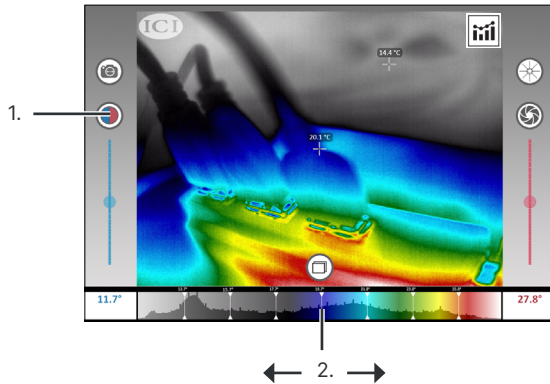
8-6-2 Manually Adjusting AGC/Level & Span Method 2

1. Click the AGC/Level & Span button to deactivate Auto Gain Control. Level & Span control sliders appear.
2. Click Min or Max numbers on either side of the Level & Span Histogram. An input window opens.
3. Type the preferred temperature.
4. Click Enter. Contrast changes.



8-6-3 Manually Adjusting AGC/Level & Span Method 3

1. Click the AGC/Level & Span button to deactivate Auto Gain Control. Level & Span control sliders appear.
2. Click and drag the Level & Span Histogram in the right or left directions to adjust the thermal window. For touch screen devices touch and slide the histogram in the right or left directions.



THE CAMERA MODE BUTTON CHANGES DEPENDING ON THE USER'S SELECTION: VIDEO, CAMERA, OR REVIEW.

8-7 Camera Mode

This button has three options: Video Mode, Camera Mode, and Review Mode. Camera Mode is the default mode available when Touch Mode starts. Users can cycle through the available options by clicking inside the ring. The button changes to reflect the current camera mode selected. Stop clicking the icon when the preferred mode is reached. The mode can also be changed in Research Mode (see Section 13-2-3 Camera Modes).



Video Mode

or



Camera Mode

or



Review Mode

8-8 Capture Videos in Touch Mode

Only videos can be captured using this mode. Saving occurs automatically. Record a video as follows:

1. Ensure Video Mode is selected (see Section 8-7 Camera Mode).
2. The Capture button becomes the Record button. Click the Record button to begin recording a video.



3. Once recording starts, the Record button becomes the Stop button. Click the Stop button to stop recording.



IN RESEARCH MODE, CAPTURED VIDEOS ARE SHOWN IN AND CAN BE REVIEWED FROM THE CAPTURED IMAGES GALLERY AT THE BOTTOM OF THE MAIN SCREEN. THE GALLERY FEATURE IS NOT AVAILABLE IN TOUCH MODE.

8-9 Capture Images in Touch Mode

Camera Mode is the default mode available when Touch Mode starts; only single images can be captured in this mode. Additional options are available using the Settings Menu (see Sections 9-1 Settings Menu Interface and Section 11-1-2 Image Capture Options). Take a single image as follows:

1. Ensure Camera Mode is selected (see Section 8-7 Camera Mode).
2. Click the Capture button.

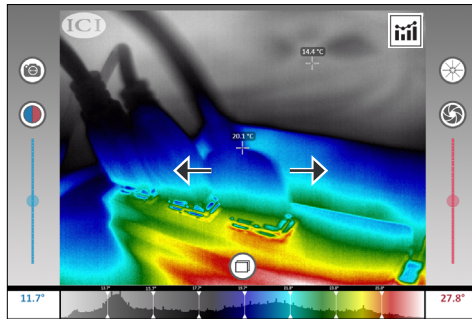


Users can capture as many images as the hard drive can store. Saving occurs automatically.

8-10 Review Images/Videos in Touch Mode

In Touch Mode, the review option does not become available unless there are images in the session to review. Review images and videos as follows:

1. Ensure Review Mode is selected (see Section 8-7 Camera Mode).
2. Click and drag the Image Display Window in the right or left directions to cycle through and review the captured images and videos. For touchscreens, swipe right or left on the Image Display Window to cycle through and review content.



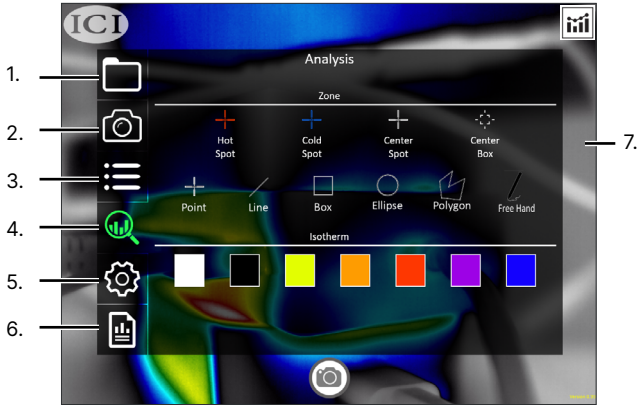
To return to the live stream cycle to Camera Mode or Video Mode by clicking inside the Camera Mode ring (see Section 8-7 Camera Mode).

IN RESEARCH MODE, CAPTURED IMAGES ARE SHOWN IN AND CAN BE REVIEWED FROM THE CAPTURED IMAGES GALLERY AT THE BOTTOM OF THE MAIN SCREEN (SEE 13-2-6 REVIEW IMAGES/VIDEOS IN RESEARCH MODE). THE GALLERY FEATURE IS NOT AVAILABLE IN TOUCH MODE.

9. Settings Menu

9-1 Settings Menu Interface

Touch Mode is designed for capturing images and videos rapidly. Analysis may be performed by accessing the Settings Menu; however, the overall selection of tools is limited. Users can gain access to additional settings and options in Research Mode (see [Chapter 13 Research Mode](#)). ICI recommends switching the Research Mode in order to generate reports.



- | | |
|-------------|---------------|
| 1. File | 5. Tools |
| 2. Camera | 6. Reports |
| 3. Options | 7. Close Menu |
| 4. Analysis | |

9-2 Opening the Settings Menu

1. Right-click the Image Display Window. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Settings Menu opens.

9-3 Closing the Settings Menu

To close the Settings Menu click anywhere outside of the menu system.

THE SETTINGS MENU IS PRIMARILY USED IN TOUCH MODE BUT IS ALSO ACCESSIBLE IN RESEARCH MODE FOR USER CONVENIENCE.

10. Managing Projects in Touch Mode

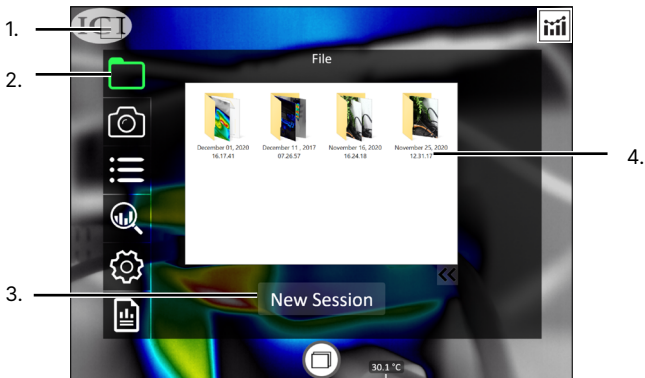
Projects can be managed directly within Touch Mode by accessing the File options available in the Settings Menu.

10-1 Create a New Project within Touch Mode

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the File icon.
3. Click New Project.
4. Name the folder. A new project has now been created in the directory and appears in the Projects Menu of the software. Proceed to next section to create a new session.

10-2 Create a New Session within Touch Mode

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Either create a new project folder for the session or locate and select the preferred project folder for the Session.
3. Click Open Project.
4. Click New Session.
5. Name the folder. A new session has now been created in the directory and appears in the Projects Menu of the software. Proceed to next section to open a session.



CLICKING THE << BUTTON RETURNS USERS TO THE TOP SAVE FOLDER.

10-3 Open a Session within Touch Mode

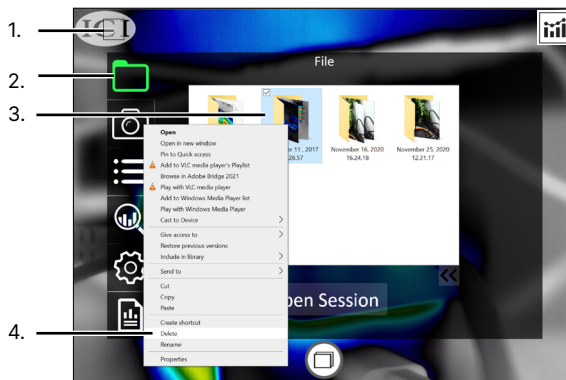
Load a new session or access files from a previous session:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the File icon.
3. Find and select preferred Project.
4. Click Open Project.
5. Find and select preferred session.
6. Click Open Session.

The session opens allowing the user to begin capturing images or perform analysis.

10-4 Delete a Session or Project within Touch Mode

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the File icon.
3. Find project or session folder to be deleted.
4. Right-click on project or session folder. For touchscreens, touch and hold until a box pops up; then, release hold.
5. Click delete.



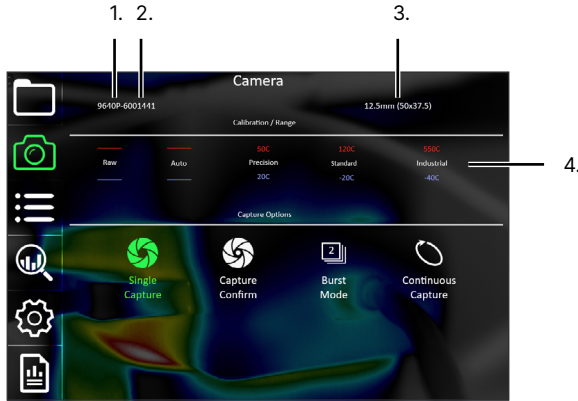
SESSIONS CAN ONLY BE IMPORTED OR EXPORTED FROM THE PROJECTS MENU (SEE SECTION 7-1-5 IMPORT A NEW SESSION AND SECTION 7-1-6 EXPORT A NEW SESSION).

11. Advanced Settings and Options in Touch Mode

11-1 Camera Information and Capture Options

11-1-1 Infrared Camera and Calibration Information

Users can find information relevant to their device in the Camera section of the Settings Menu. To open the menu right-click the Image Display Window. For touchscreens, touch and hold until a box pops up; then, release hold.



- | | |
|--------------------------|-----------------------------------|
| 1. Infrared Camera Model | 3. Lens (Field of View) |
| 2. Camera Serial Number | 4. Temperature Calibration Ranges |

The Infrared Camera Model and Camera Serial Number should match the name and number on the user's infrared camera to achieve the most accurate temperatures. Contact customer service if the serial numbers do not match.

Lens settings are automatically detected and displayed by the software. Data is represented as Focal Length (Field of View).

Multiple calibration files may be available for selection. Change the temperature range by selecting the preferred calibration: Precision, Standard, or Industrial. Only one calibration can be active at a time. The active temperature highlights green. If a range does not highlight there is only one calibration file. Contact customer service for missing calibration files.

EACH CAMERA'S CALIBRATION FILES ARE UNIQUE AND CANNOT BE TRANSFERRED TO OTHER INFRARED CAMERAS.

11-1-2 Image Capture Options

The Image Capture Options define the capture type and interval of the camera. Users can take images one at a time (Single and Capture Confirm Modes), perform a photo burst of a set number of images, or take a continuous number of snapshots for a limited duration. An active mode is highlighted green; only one mode can be active at a time.

Users can find Image Capture Options by right-clicking the Image Display Window to open the Settings Menu and selecting the Camera Icon. For touchscreens, touch and hold until a box pops up; then, release hold.



THE CAPTURE BUTTON CHANGES TO REFLECT THE CURRENTLY SELECTED CAPTURE OPTION. SEE 14-2-4 IMAGE CAPTURE MODES FOR RESEARCH MODE OPTIONS.

11-1-2-1 Single Capture Mode

Only single images can be captured in this mode and saving occurs automatically. Take a single image as follows:

1. Ensure Camera Mode is selected (see Section 8-7 Camera Mode).
2. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
3. Click the Camera icon.
4. Select Single Capture. Feature highlights green when selected.
5. Close menu by clicking outside of the Settings Menu.
6. Notice the Capture button has changed to reflect the new capture mode. Click the Capture button.



SAVING EVENTS MUST BE CONFIRMED IN ORDER FOR IMAGES TO BE SAVED WHEN USING CONFIRM CAPTURE MODE. SWITCH TO SINGLE CAPTURE MODE TO TURN OFF CONFIRM ON SAVE OPTION.

11-1-2-2 Confirm Capture Mode

Only single images can be captured using Confirm Capture mode; however, users must decide whether or not the captured image should be saved to the hard drive. Take an image and confirm its save as follows:

1. Ensure Camera Mode is selected (see Section 8-7 Camera Mode).
2. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
3. Click the Camera icon.
4. Select Confirm Capture. Feature highlights green when selected.
5. Close menu by clicking outside of the Settings Menu.
6. Notice the Capture button has changed to reflect the new capture mode. Click the Capture button.



7. Capture and (NUC) buttons change into save (floppy disk icon) and cancel ("X" icon) buttons. Click Save button to add the image to the Captured Images Gallery or click Cancel to exit the saving process.

Save



or

Cancel

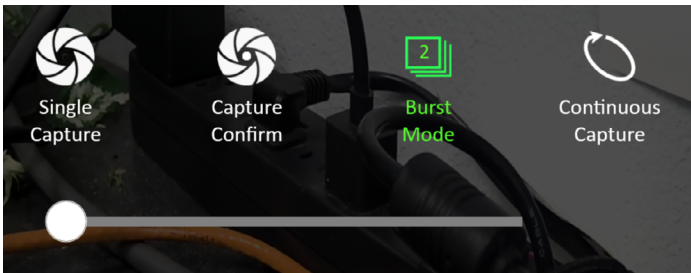


SAVING EVENTS MUST BE CONFIRMED IN ORDER FOR IMAGES TO BE SAVED WHEN USING CONFIRM CAPTURE MODE. SWITCH TO SINGLE CAPTURE MODE TO TURN OFF CONFIRM ON SAVE OPTION.

SAVING OCCURS AUTOMATICALLY IN BURST MODE.**11-1-2-3 Burst Mode**

Users can capture and save up to 10 images each time the Capture button is pressed by utilizing Burst Mode. Take an image series as follows:

1. Ensure Camera Mode is selected (see Section 8-7 Camera Mode).
2. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
3. Click the Camera icon.
4. Select Burst Mode. A slider appears underneath and The feature highlights green when selected.



5. Use the slider to define the number of images to be captured (2 minimum - 10 maximum).
6. Close menu by clicking outside of the Settings Menu.
7. Notice the Capture button has changed to reflect the new capture mode. Click the Capture button to begin capturing series.



Once started, Burst Mode cannot be paused or stopped. Rather the program takes the number of images defined each time the button is pressed.

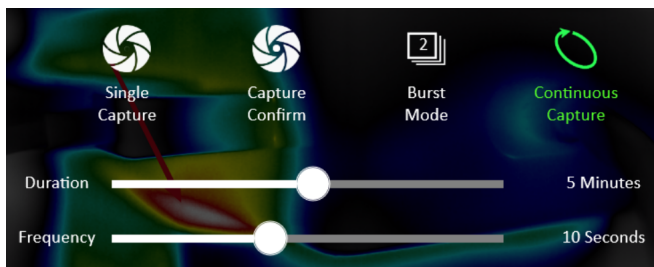
ONCE STARTED, BURST MODE CANNOT BE PAUSED OR STOPPED. SWITCH TO CONTINUOUS CAPTURE MODE TO ENABLE PAUSING AND STOPPING. SAVING OCCURS AUTOMATICALLY IN CONTINUOUS CAPTURE MODE.

SAVING OCCURS AUTOMATICALLY IN CONTINUOUS CAPTURE MODE.

11-1-2-4 Continuous Capture Mode

Capture and save an uninterrupted stream of images for a set amount of time using the Continuous Mode feature. Set continuous imaging as follows:

1. Ensure Camera Mode is selected (see Section 8-7 Camera Mode).
2. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
3. Click the Camera icon.
4. Select Continuous Capture. Sliders appear underneath and The feature highlights green when selected.
5. Adjust sliders to preferred duration and frequency. The settings on the example image below take 1 image every 10 seconds for 5 minutes:



6. Close menu by clicking outside of the Settings Menu.
7. Notice the Capture button has changed to reflect the new capture mode. Click the Capture button to begin capturing series.



8. Once pressed, the Capture button converts to a stop icon for the duration and frequency of the series. Users can halt the series at anytime by clicking the stop icon. The icon reverts back to the original icon. Start recording again by clicking the reverted Capture button.



11-2 Temperature and Polarity Settings

11-2-1 Selecting a Temperature Scale

Raw, Kelvin, Celsius, and Fahrenheit temperature scales are available to users. Define a temperature scale as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Options icon.
3. Select a temperature scale. The chosen option highlights green when active.
4. Close menu by clicking outside of the Settings Menu.



11-2-2 Polarity Options (Color Palette)

The Palette section allows the user to control the image polarity by which the current image is displayed, saved, and printed. Change the polarity as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Options icon.
3. Select a color palette. The chosen option highlights green when active and the palette is seen activating through the semi-transparent Settings Menu. Click the invert Palette icon to reverse the colors.
4. Close menu by clicking outside of the Settings Menu.

ONLY ONE PALETTE CAN BE ACTIVE AT A TIME.

11-3 Analysis in Touch Mode

11-3-1 Zones and Regions of Interest

Users can gather additional data by activating Zones and Regions of Interest (ROI). Zones are toggled on/off while ROI are drawn on the Image Display Window. Data gathered by creating ROIs in Touch Mode can be retrieved and edited in Research Mode (see Section 13-6-2 Generate a Report in Research Mode and Section 14-2 Radiometry Correction).

11-3-1-1 Creating and Deleting Zones

The following Zones can be toggled on/off:

- **Hot Spot** - Locates and marks the hottest pixel in the scene.
- **Cold Spot** - Locates and marks the coldest pixel in the scene.
- **Center Spot** - Locates and marks the center pixel in the scene.
- **Center Box** - Creates a square in the center of the scene and averages the temperature inside. A Center Spot can be activated at the same time to gather additional data.

Toggle a Zone on/off (create/delete) as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Toggle on one or several Zones by clicking on the preferred icon. Toggle off Zones by clicking the icon a second time.
3. Close menu by clicking outside of the Settings Menu.

11-3-1-2 Creating an ROI

Regions of Interest are drawn within the Image Display Window. Add an ROI as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Choose ROI type (Point, Line, Box, Ellipse, etc.) by clicking on the preferred icon. Settings Menu auto closes.
3. Click inside the Image Display Window to set points. Click and drag to draw shapes until an area is encompassed. For touchscreens, touch and hold; then, drag to draw shapes.

11-3-1-3 Deleting an ROI

While Zones can be toggled on/off ROIs can only be deleted from Research Mode (see Section 13-4-1-4 Delete an ROI). Erased data is NOT recoverable.

11-3-1-4 Moving an ROI

Regions of Interest can be moved unlike Zones which target specific temperatures or areas of the Image Display Window. Move an ROI as follows:

1. Select ROI to be moved by clicking it. Black boxes appear around the ROI when selected.
2. Click and drag the preferred ROI to move it to a new location. For touchscreens, touch and hold; then, drag.

11-3-1-5 Resizing an ROI

Unlike Zones, Regions of Interest can be resized to include or exclude additional data:

1. Select preferred ROI to be resized by clicking it. Black boxes appear around the ROI when selected.
2. Click and drag black boxes to resize ROI. For touchscreens, touch and hold; then, drag.

11-3-2 Isotherms in Touch Mode

An Isotherm is a definable, high-contrast overlay that allows users to locate regions exhibiting similar temperatures or highlight and define hot/cold regions of monochromatic images.

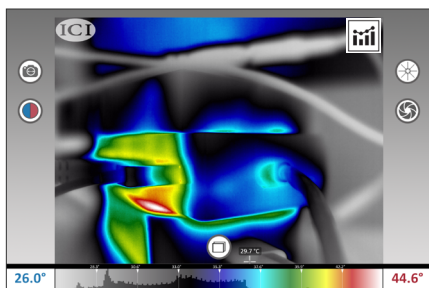
11-3-2-1 Creating and Deleting Isotherms

Isotherms can be toggled on/off (create/delete). Define a temperature region as follows:

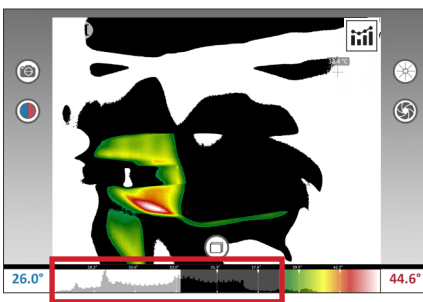
1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Toggle on one or several Isotherms by clicking the squares of color. Sliders appear underneath and the Isotherm is seen activating through the semi-transparent Settings Menu. Toggle off Isotherms by clicking the squares of color a second time.
3. Adjust Min and Max sliders until preferred areas are covered.
4. Close menu by clicking outside of the Settings Menu.

In the below example, white and black Isotherms have been used to block out the temperature ranges between 25.8 °C 33.6 °C and 33.7 ° - 38.0 °C, respectively (to change temperature scale see Section 11-2-1 Selecting a Temperature Scale). Note the Isotherm ranges are displayed on the Level & Span Histogram.

Before



After



11-4 Tools

A limited selection of Tools is available in Touch Mode to assist with image processing and converting radiometric videos to the MP4 format.

11-4-1 Video Conversion

Videos are recorded in IR Flash Pro containing radiometric infrared data which is useful for analysis and report building. These files are saved in ICI's proprietary V16 format which is quite large due to the radiometric data stored within. In order to send videos to clients you may need to convert them to the MP4 format. IR Flash Pro has a built-in feature for converting videos for you:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Tools icon.
3. Choose to convert a single video or all videos by clicking the icons:



Convert Radiometric
Video to MP4

or



Convert all Radiometric
Videos to MP4

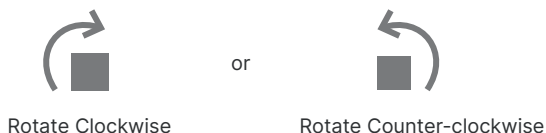
4. Close menu by clicking outside of the Settings Menu.

11-5 Image Processing

11-5-1 Rotate Image

Users can change the orientation of the Image Display Window image using the built-in rotation features as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Tools icon.
3. Choose to rotate image clockwise or counter-clockwise by clicking the icons:



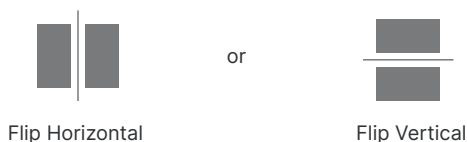
4. Close menu by clicking outside of the Settings Menu.

The Image Display Window image turns 90° in the chosen direction. Four clicks is 360° and resets the image to the original setting.

11-5-2 Flip Image

Flip the Image Display Window image on either the horizontal or vertical axis as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Tools icon.
3. Choose to flip image horizontally or vertically by clicking the icons:



4. Close menu by clicking outside of the Settings Menu.

The Image Display Window image flips 180° in the chosen direction. Two clicks is 360° and resets the image to the original setting.

11-5-3 Apply Palette to all Images

A user can define a preferred polarity (color palette) and then extrapolate these settings and apply them to all images in a series as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Tools icon.
3. Click Apply Current Selected Image Palette to all Images.
4. Close menu by clicking outside of the Settings Menu.

11-5-4 Apply Settings to all Images/Radiometric Videos

IR Flash makes it easy to apply Level & Span and polarity settings to all the captured images/radiometric videos in a series. Do so as follows:

1. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
2. Click the Tools icon.
3. Click Apply Settings to all Images.
4. Close menu by clicking outside of the Settings Menu.

11-6 Reports

11-6-1 Annotations

Users can further highlight areas of interest by annotating arrows drawn on the Image Display Window. IR Flash Pro has 5 color options for drawing arrows. Users can use the same color to make all their annotations or create a color coded system using the available color options.

IT IS BEST PRACTICE TO GENERATE REPORTS IN RESEARCH MODE (SEE SECTION 13-6 REPORT BUILDING). ANNOTATIONS CAN BE MADE IN EITHER RESEARCH MODE OR TOUCH MODE.

11-6-1-1 Create an Annotation

1. Ensure Review Mode is selected (see Section 8-7 Camera Mode).
2. Click and drag to locate the preferred image. For touchscreens, swipe left/right.
3. Right-click the Image Display Window to open the Settings Menu. For touchscreens, touch and hold until a box pops up; then, release hold.
4. Click the Reports icon.
5. Choose annotation color by clicking on an arrow. Settings Menu auto closes.
6. Click and drag to draw an arrow. Wherever the user clicks is where the arrowhead appears. For touchscreens, press and hold; then, drag.
7. Click Yes to add annotation to the corresponding visible image (if applicable). Click No to place annotation on infrared image only.

11-6-1-2 Move an Annotation

1. Select annotation by clicking the preferred arrow. Black squares appear around the annotation when selected.
2. Click and drag annotation to new location. For touchscreens, press and hold; then drag.

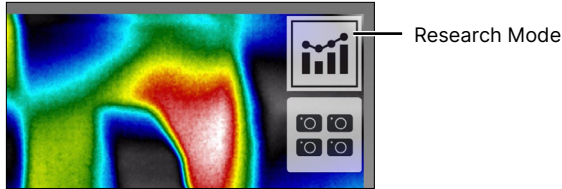
11-6-1-3 Resize or Change an Annotation

1. Select annotation by clicking the preferred arrow. Black squares appear around the annotation when selected.
2. Click and drag black squares to resize annotation or change its direction. For touchscreens, press and hold, then drag.

12. Switching between Interface Modes

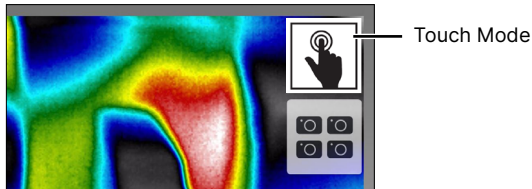
12-1 Enter Research Mode

IR Flash Pro starts in Touch Mode by default for rapid image capture. Users can switch to Research Mode for in-depth image analysis and report generation by clicking the Research Mode icon in the upper-right hand corner of the Image Display Window.



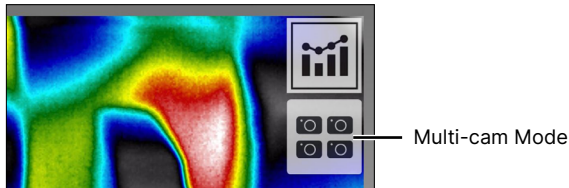
12-2 Enter Touch Mode

When in Research Mode, users can return to Touch Mode by clicking the Touch Mode icon in the upper-right hand corner of the Image Display Window.



12-3 Enter Multi-cam Mode

There must be more than one device connected to IR Flash Pro in order for the user to access Multi-cam Mode. When multiple devices are connected the user may enter Multi-cam Mode by click the Multi-Mode icon in the upper-right hand corner of the Image Display Window.

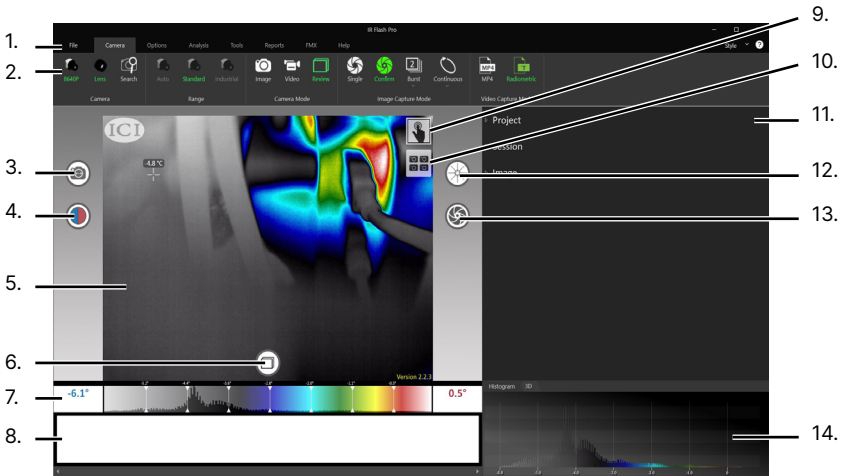


13. Research Mode

Research Mode is primarily used for in-depth image analysis and report generation. For rapid image capture enter Touch Mode by clicking the icon in the upper-right hand corner of the Image Display Window (see Chapter 12 Switching between Interface Modes).

13-1 Main User Interface

The Main User Interface of Research Mode shows live infrared/visible feeds, allows users to capture and store images/videos in an image gallery, enhance thermal images, and analyze thermal radiometric data. The layout of the main user interface is shown below:



- | | |
|---|-------------------------------------|
| 1. Main Menu | 8. Captured Images Gallery |
| 2. Sub-menu | 9. Multi-cam Mode |
| 3. Select Mode Function | 10. Touch Mode (see Chapter 9) * |
| 4. Auto Gain Control (AGC)/Level & Span | 11. Project Information/Zones |
| 5. Image Display Window (Settings Menu) | 12. Non-Uniformity Correction (NUC) |
| 6. Camera Mode | 13. Capture * |
| 7. Level & Span Histogram | 14. Histogram |

* **CLICKING THE ICON IN THE UPPER-RIGHT HAND CORNER TAKES THE USER TO TOUCH MODE.**

+ **THE CAPTURE BUTTON APPEARS DIFFERENTLY DEPENDING ON CAMERA MODE AND IMAGE CAPTURE MODE SETTINGS.**

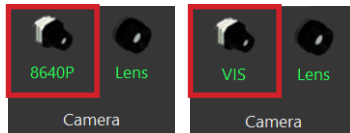
The Sub-menu is a semi-permanent set of quick select options that vary according to the Main Menu Selection. These options assist users in taking images and performing thermal analysis. Change the Sub-menu options by selecting a different Main Menu tab.

13-2 Camera Options

The Camera section of the Main User Interface is selected by default when users first enter Research Mode. This menu gives users access to camera information and the calibration range(s) of their camera (if multiple ranges are available). Users can switch between capturing images and videos and also configure the capture modes.

13-2-1 Connected Camera and Len Options

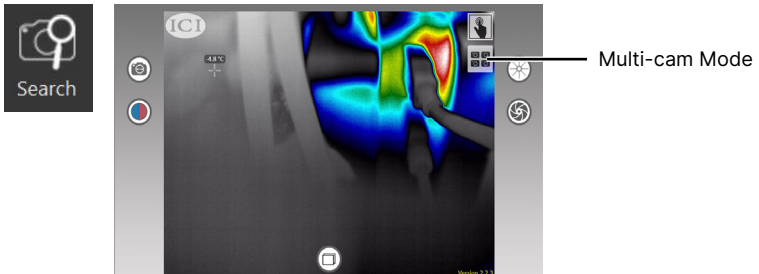
The Camera section informs users whether the thermal camera or visible camera is currently being utilized: infrared (camera model) or visible (Vis). Use the Select Mode Function to switch between infrared and visible feeds ([see Section...](#)).



Information regarding the attached lens is also available. Multiple calibration files are required if more than one lens has been purchased. The lens settings are automatically detected by the software.

13-2-2 Camera Search

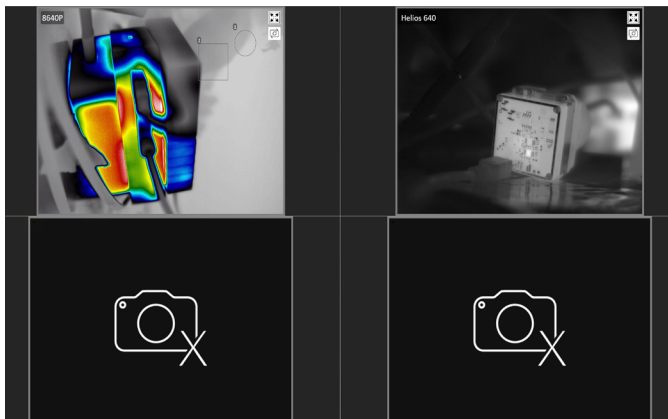
The camera search tool allows users to automatically search for and connect thermal devices to IR Flash Pro. Click the Search Camera icon and IR Flash automatically locates devices. If more than one thermal device is connected the Image Display Window refreshes to include the Multi-cam option.



13-2-3 Multi-cam Mode

To enter Multi-cam Mode the user must first search for all connected devices (see [Section...13-2-2 Camera Search](#)). Click the Search Camera icon and IR Flash Pro automatically locates and connects thermal devices. If more than one thermal device is connected the Image Display Window refreshes to include the Multi-cam option.

Tap the Multi-cam icon to open Multi-cam Mode. Live feeds from devices appear with their model names. Empty feeds appear with a no device icon.



13-2-3-1 Expand a Feed to Full-screen

Click the maximize icon in the corner of a feed window to expand the feed. Expanding a feed to full screen allows the user to perform thermal analysis. Click the Multi-cam icon to return to Multi-cam Mode.



13-2-3-2 Switch between IR and Digital Feeds

Click the Select Mode Function icon to switch between IR and digital feeds.



13-2-4 Change the Temperature Range

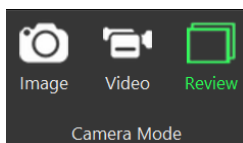
The Range section grants users control of the temperature range detected by the thermal device by selecting a pre-calibrated range: Auto, Standard, or Industrial (high temperature range). Some models only offer one range (Standard) whereas other cameras offer several ranges. Multiple calibration files are required to access all ranges. Grayed out modes are not selectable.

Only one temperature range can be active at a time. An active range is highlighted green when selected. Choosing a range causes IR Flash Pro to automatically adjust its settings.

EACH CAMERA'S CALIBRATION FILES ARE UNIQUE AND CANNOT BE TRANSFERRED TO OTHER INFRARED CAMERAS. IF YOUR PACKAGE INCLUDES ADDITIONAL LENS OPTIONS AND TEMPERATURE RANGES A SEPARATE CALIBRATION FILE IS REQUIRED FOR EACH LENS AND TEMPERATURE RANGE.

13-2-5 Camera Modes

IR Flash Pro's Camera Mode section has three options; Image mode, Video mode, and Review mode. Users can change the current mode by visiting the Camera tab from the Main Menu and clicking an icon from the Camera Mode Sub-menu. An active mode is highlighted green; only one mode can be active at a time.



Another way to change the current mode is to cycle the Camera Mode button located at the bottom of the Image Display Window. Cycle modes by clicking inside the ring. The button changes to reflect the current camera mode selected. Stop clicking the icon when the preferred mode is reached.



Video Mode

or



Camera Mode

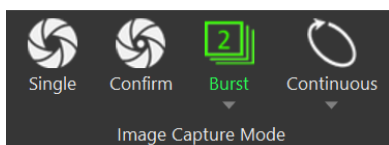
or



Review Mode

13-2-6 Image Capture Modes

The Image Capture Mode section defines the capture interval of the camera. Users can take images one at a time (single), perform a photo burst of a set number of images, or take continuous shots for a limited duration. Users can change the current mode by visiting the Camera tab from the Main Menu and clicking an icon from the Image Capture Mode Sub-menu. An active mode is highlighted green. Only one mode can be active at a time and only images can be captured using these modes.



The Capture button, used to take and save images to the Captured Images Gallery, changes to reflect the currently selected Image Capture Mode:



or



or



or



CAPTURE BUTTON APPEARS DIFFERENTLY DEPENDING ON CAMERA MODE AND IMAGE CAPTURE MODE SETTINGS.

13-2-6-1 Single Mode

Single mode takes one photo and saves it directly to the Captured Images Gallery. Take an image as follows:

1. Click Camera from the Main Menu.
2. Select the Single mode button from the Image Capture Mode Sub-menu by clicking on the icon. The feature highlights green when selected.



3. Click the Capture button. The image is saved directly to the Captured Images Gallery below the Image Display Window.

13-2-6-2 Confirm Mode

Users decide whether or not to save a captured image to the Captured Images Gallery when using Confirm mode. Confirm or cancel an image save as follows:

1. Click Camera from the Main Menu.
2. Select the Confirm mode button from the Image Capture Mode Sub-menu by clicking on the icon. The feature highlights green when selected.



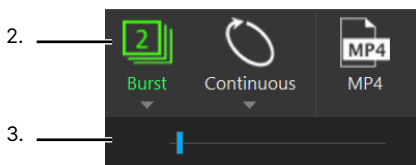
3. Click the Capture button.
4. Capture and (NUC) buttons changes to save (floppy disk icon) and cancel ("X" icon) buttons. Click Save button to add the image to the Captured Images Gallery or click cancel to exit the saving process.



13-2-6-3 Burst Mode

Users can capture a series of images each time the Capture button is pressed by utilizing Burst Mode. Images are saved directly to the Captured Images Gallery. Set up Burst Mode as follows:

1. Click Camera from the Main Menu.
2. Select the Burst mode button from the Image Capture Mode Sub-menu by clicking on the icon. The feature highlights green when selected.
3. Use the slider to determine number of images to be taken (2 minimum - 10 maximum) each time the Capture button is pressed. Capture and Burst mode buttons change to reflect number of images preferred.

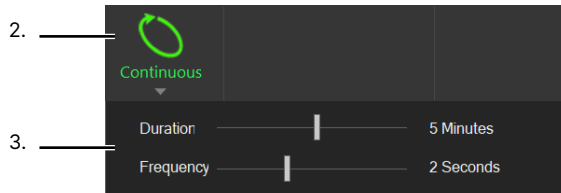


4. Click the Capture button. The number presented on the Capture button in burst mode reflects the number of images to be taken. Adjust this number using the slider in Step 3. A maximum of 10 images can be captured.

13-2-6-4 Continuous Mode

Capture an uninterrupted stream of images for a set amount of time. Images are saved directly to the Captured Images Gallery. Set up Continuous Mode as follows:

1. Click Camera from the Main Menu
2. Select the Continuous mode button from the Image Capture Mode Sub-menu by clicking on the icon. The feature highlights green when selected.
3. Use the sliders to determine the duration (1 second minimum) and frequency (1/15 second minimum) for images to be taken.
4. Capture button changes. Click the Capture button to begin series. Once activated, the Capture button converts to a stop icon. Clicking the stop icon stops the series.
5. Allow the series to finish in order to capture the full series of images.



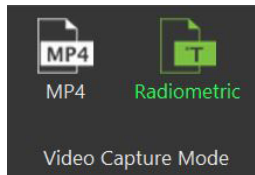
13-2-7 Video Capture Modes

Users can choose to capture videos in MP4 or V16 (Radiometric) format.

MP4 videos are smaller but do not contain the temperature data provided by V16. They are often small enough to email in most email clients.

The V16 format can only be played in IR Flash Pro whereas MP4 can be played in most video players. Radiometric videos are often too big to email.

IR Flash Pro has a built-in tool for converting V16 videos to MP4. This feature is explained in Section 14-5-1 Video Conversion.



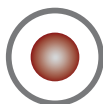
13-2-7-1 Taking a Video

Only videos can be captured in this mode. Record a video as follows:

1. Click Camera from the Main Menu.
2. Select the Video mode button from the Image Capture Mode Sub-menu by clicking on the icon. The feature highlights green when selected.



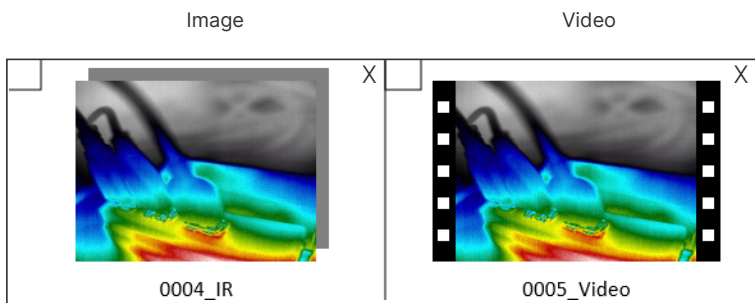
3. Capture button becomes the Record button. Click the Record button to begin recording a video.



4. Once recording starts, the Record button becomes the Stop button. Click the Stop button to stop recording.



Videos are saved directly to the Captured Images Gallery below the Image Display Window and are identifiable by the black film strips. MP4 and V16 videos can be played in IR Flash Pro. V16 videos cannot be played outside of IR Flash Pro.



VIDEOS SHOW IN THE MEDIA GALLERY WITH VIDEO STRIPS ON EACH SIDE.

13-2-8 Review Images/Videos in Research Mode

Along the bottom of the screen, are the captured images and videos. Images and videos in the captured series can be reviewed on the Image Display Window in several ways:

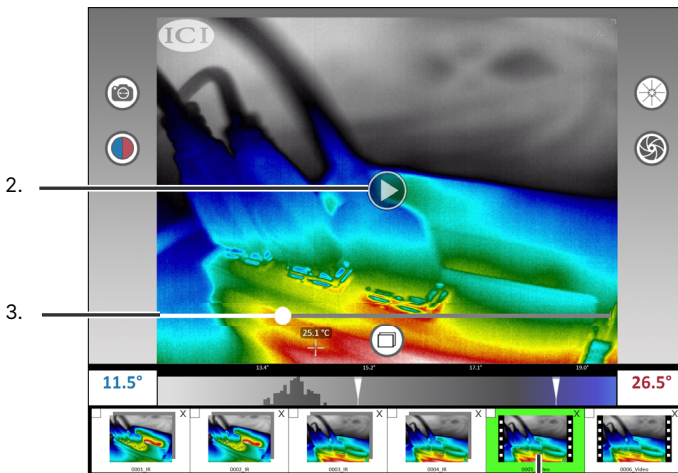
1. Click on an image or video displayed in the Captured Images Gallery.
2. Click Camera from the Main Menu and select the Review button from the Camera Mode Sub-menu by clicking the icon. Review mode is active when highlighted green.
3. Cycle through the available Camera Modes by clicking inside the ring of the Camera Mode button located at the bottom, center of the Image Display Window until review mode becomes active.

To return to live video, click the Camera Mode button at the bottom of the Image Display Window to enter Camera Mode or Video Mode.

13-2-8-1 Playing Videos in Research Mode

IR Flash Pro can play V16 and MP4 videos formats. Play a video as follows:

1. Select video for review by clicking it from the Captured Images Gallery. Videos display in Image Display Window.
2. Click Play button on Image Display Window window. Videos play automatically.
3. Videos cannot be stopped or paused, but users can click and drag to scroll forward and backward through the video using the slider at the bottom of the Image Display Window. For touchscreens, touch and hold; then drag in the left or right directions.

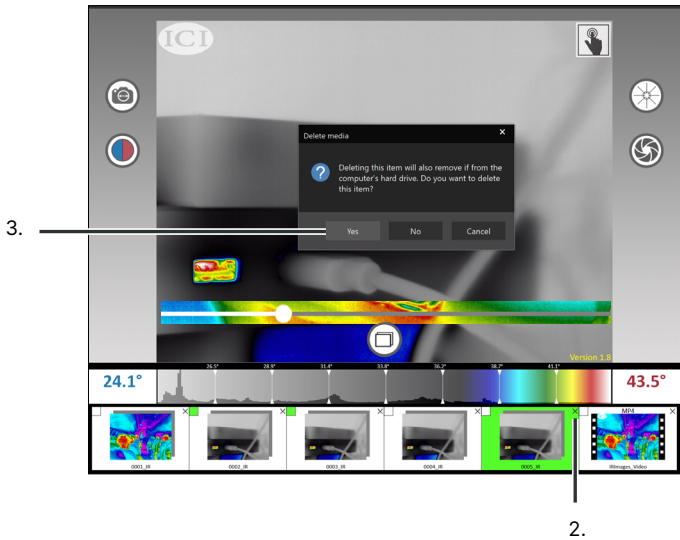


13-2-8-2 Delete Media in Research Mode

Users can delete media from the Captured Images Gallery while using Research Mode. Deleting media from the Captured Images Gallery also removes the media from the computer's hard drive. Deleted media cannot be recovered. Ensure media is no longer needed before deleting it.

Delete media as follows:

1. Decide if media should be erased.
2. Click the "X" in the upper right corner of the media to be deleted. A dialog box appears.
3. Click Yes to confirm deletion. Click No or Cancel to cancel deletion and close the dialog box.



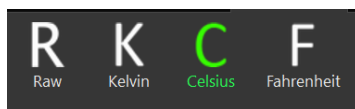
DELETING MEDIA FROM THE CAPTURED IMAGES GALLERY ALSO REMOVES THE IMAGE FROM THE COMPUTER'S HARD DRIVE.

DELETED MEDIA CANNOT BE RECOVERED. ENSURE MEDIA IS NO LONGER NEEDED BEFORE DELETING IT.

13-3 Options

13-3-1 Temperature Options

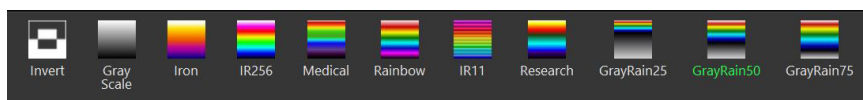
Users can change the unit of temperature within IR Flash Pro by visiting the Options Sub-menu and choosing between Raw, Kelvin, Celsius, and Fahrenheit scales. Select an option by clicking the preferred scale icon. The chosen temperature scale highlights green when active.



Current Scale

13-3-2 Polarity Options (Color Palette)

The Palette section allows the user to control the image color theme. To change the polarity, visit the Options Sub-menu and select the preferred palette by clicking the preferred square of color. The chosen theme highlights green when active. Click the invert Palette icon to reverse the colors.



Invert Palette

Current Palette

13-4 Analysis in Research Mode

13-4-1 Zones and Regions of Interest

Users can gather additional data by activating Zones or Regions of Interest (ROI). Zones can be toggled on/off while ROIs can be drawn on the Image Display Window. Zone information is displayed on the Image Display Window. Information gathered by creating ROIs is stored in the Project Information/Zones area and can be retrieved by clicking the drop-down tab next to "Zones". Users can scroll through the ROI data using the scroll bar.

Zones						
	Min	Avg	Max			
1	20.2 °C	23.1 °C	25.5 °C	△	●	⚙
2	21.2 °C	23.6 °C	26.1 °C	△	●	⚙
3	21.0 °C	22.9 °C	25.1 °C	△	●	⚙
DT: 1 - 2					●	⚙
Name	1	2				
Min	20.2 °C	21.2 °C	-1.1 °C			
Avg	23.1 °C	23.6 °C	-0.6 °C			
Max	25.5 °C	26.1 °C	-0.6 °C			

13-4-1-1 Zones

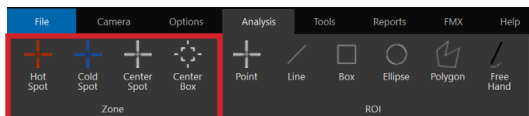
Zones can be toggled on/off. Zone data cannot be seen in the Project Information/Zones area; rather, the information is displayed on the Image Display Window.

The following Zones can be activated:

- **Hot Spot** - Locates and marks the hottest pixel in the scene.
- **Cold Spot** - Locates and marks the coldest pixel in the scene.
- **Center Spot** - Locates and marks the center pixel in the scene.
- **Center Box** - Creates a square in the center of the scene and averages the temperature inside. A Center Spot can be activated at the same time to gather additional data.

Toggle on/off Zones as follows:

1. Click Analysis from the Main Menu.
2. Enable a Zone by clicking the preferred Zone icon. Feature text highlights green when active; multiple Zones can be activated at once. Disable Zones by clicking the Zone icon again. Feature text turns white when deactivated.



13-4-1-2 Regions of Interest (ROI)

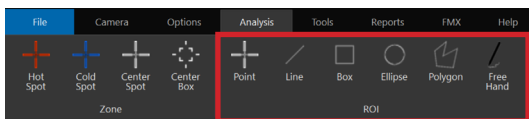
ROIs can be drawn on the Image Display Window. Information gathered by creating ROIs is stored in the Project Information/Zones area and can be retrieved by clicking the drop-down tab next to “Zones”.

13-4-1-2-1 Create an ROI

Add an ROI to an image as follows:

1. Click Analysis from the Main Menu.
2. Choose ROI type (Line, Box, Ellipse, etc.) by clicking the preferred icon.
3. Click inside the Image Display Window to set points. Click and drag to draw shapes until an area is encompassed. For touchscreens, touch and hold; then, drag to draw shapes.

Once users have placed ROI on the Image Display Window, detailed management of the ROI can be accomplished in the Project Information/Zones area.

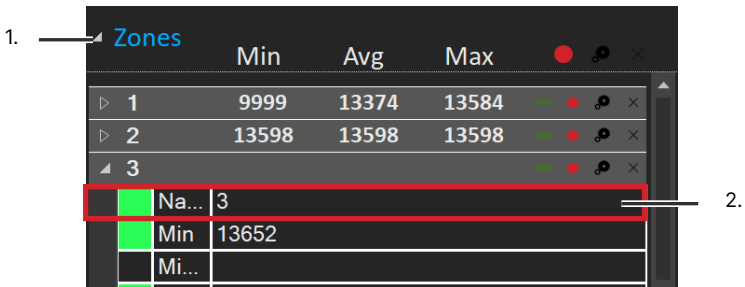


13-4-1-2-2 Rename an ROI

Users can rename ROIs in the Project Information/Zones area.

Rename an ROI from an image as follows:

1. Click Zones drop down in the Project Information/Zones area.
2. Click the input box next to Name of the ROI to be renamed.
3. Type in a new name. The new name displays above the ROI on the Image Display Window.



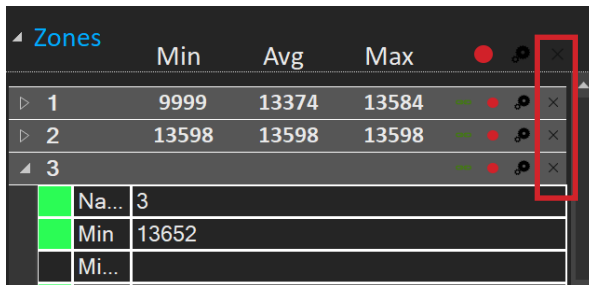
13-4-1-2-3 Delete an ROI

Users can delete ROIs from the Project Information/Zones area. Erased data cannot be recovered.

Delete an ROI from an image as follows:

1. Click Zones drop down in the Project Information/Zones area.
2. Click the "X" next to the ROI to be deleted

The Region of Interest and its data disappears from the list and the zone representing the data is removed from the Image Display Window.



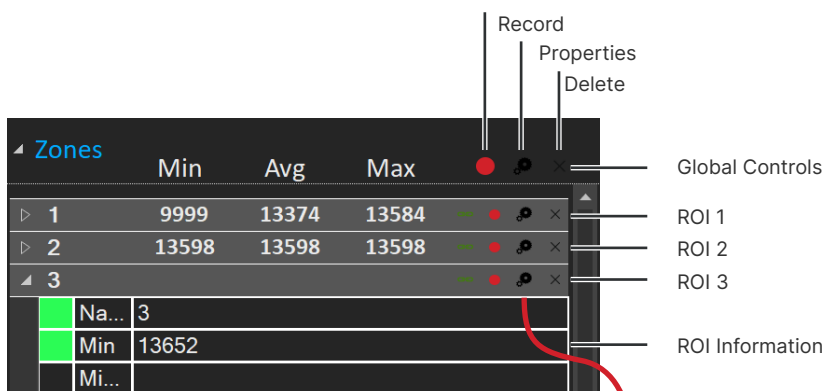
13-4-2 Data Collection

IR Flash Pro has built-in features for data collection and exportation. Find these options in the Project Information/Zones area.

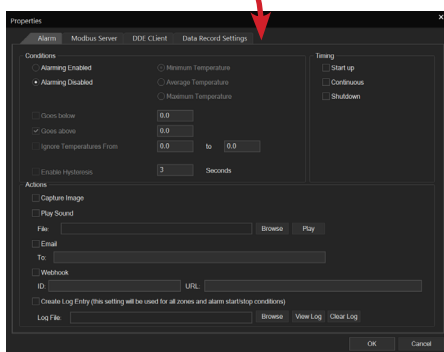
Click the large, red Global Record icon to export data for all ROIs at the same time, or click the small, red ROI Record icon of an individual ROI to record data for a singular area of interest.

Click the Global Properties icon to change global settings, or click the Properties icon of an individual ROI to edit the settings for a singular zone. In some cases, individual ROI settings may override Global Properties but the user can disable and re-enable the Global Properties to reset the settings.

Click the Global "X" to erase all ROI or click the "X" next to an individual ROI to erase it. Ensure deletion is required before erasing. Deleted ROIs cannot be recovered.



Properties Window



DELETED ROIS CANNOT BE RECOVERED.

THE USER MUST HAVE A THERMAL DEVICE CONNECTED TO ACCESS ALL DATA RECORDING SETTINGS.

13-4-2-1 Data Record Settings

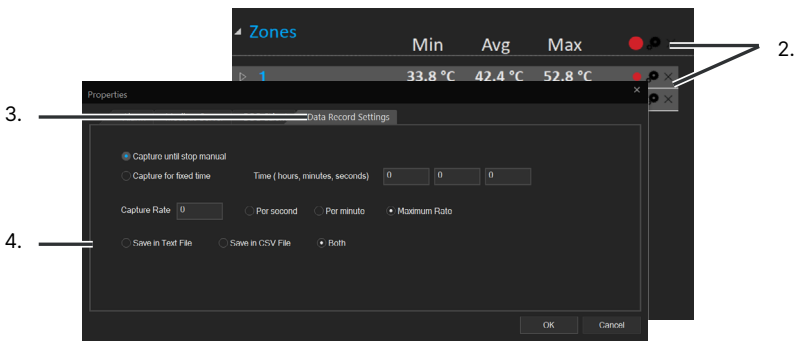
13-4-2-1-1 Data File Type

ROI data can be exported separately or simultaneously to TXT or CSV file formats. By default, exported files are saved to the current project folder.

Change the file type settings as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Click the Properties icon of the preferred ROI to open settings; or click the Global Properties icon to control settings for all ROI.
3. Click Data Record Settings.
4. Choose an export file type:
 - **Save in Text File** - Saves data in a text file format (TXT). This file type can be opened and edited in almost any text-editing or word-processing program; or
 - **Save in CSV File** - Saves data in a comma-separated values file format (CSV). This file type is useful for opening files in spreadsheet programs and databases; or
 - **Both** - Saves data in both text file (TXT) and comma-separated values file (CSV) formats. Exporting both file types is useful when both file types are required or when the user is unsure which file type is needed.
5. Click OK to accept changes. Click Cancel to cancel changes.

In some cases, Global Properties may override ROI settings, e.g. if Zone #1 is set to export to a CSV file but the Global Properties are set to export to a TXT file, the data is only exported to a TXT file when the Global Record icon is pressed and no data is exported to a CSV file. Adjust export settings to achieve preferred results.



THE USER MUST HAVE A THERMAL DEVICE CONNECTED TO ACCESS ALL DATA RECORDING SETTINGS.

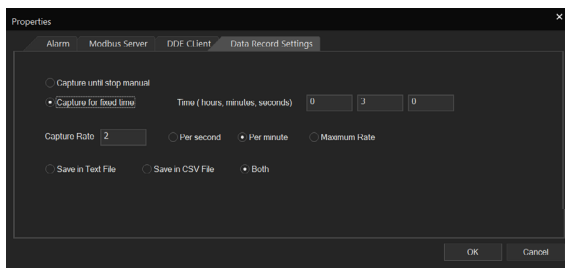
13-4-2-1-2 ROI Capture Settings

IR Flash Pro has built-in settings for data recording.

Adjust the capture settings as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Click the Properties icon of the preferred ROI to open settings; or click the Global Properties icon to control settings for all ROI.
3. Click Data Record Settings.
4. Choose a capture setting:
 - **Capture until stop manual** - Continuously saves data until stopped by the user; or
 - **Capture for fixed time** - Saves data at a user defined interval. The user must define the following settings:
 - **Time** - The length of time the data capture sequence runs in hours, minutes, and seconds;
 - **Capture rate** - The number of captures to perform; and
 - **Interval** - Defines the time between captures (per second, per minute, etc).

Example: IR Flash Pro will capture 2 data point per minute for 3 minutes with the below settings.



5. Click OK to accept changes. Click Cancel to cancel changes.

In some cases, Global Properties may override ROI settings, e.g. if Zone #1 is set to export to a CSV file but the Global Properties are set to export to a TXT file, the data is only exported to a TXT file when the Global Record icon is pressed and no data is exported to a CSV file. Adjust export settings to achieve preferred results.

THE USER MUST HAVE A THERMAL DEVICE CONNECTED TO ACCESS ALL DATA RECORDING SETTINGS.**13-4-2-2 Export ROI Data**

It is possible for users to record and export data. When a user presses record, each ROI's data is exported to its own, individual file which is named `ici_zone_data#` where # is the ROI name. The file includes the ROI's name, e.g. Zone #1, as well as the minimum, maximum, and average temperatures detected within the area of interest. Standard deviations are also recorded along with the serial number of the camera as well as date and time stamps.

By default, exported files are saved to the current project folder.

Export ROI data as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Adjust ROI capture settings (see Section 13-4-2-1-2 ROI Capture Settings).
3. Choose an option:
 - Click the large, red Global Record icon to export data for all ROIs at the same time; or
 - Click the small, red ROI Record icon next to an individual ROI to record data for a singular ROI.

In some cases, Global Properties may override ROI settings, e.g. if Zone #1 is set to export to a CSV file but the Global Properties are set to export to a TXT file, the data is only exported to a TXT file when the Global Record icon is pressed and no data is exported to a CSV file. See Section 13-4-2-1-2 ROI Capture Settings to adjust export settings.

13-4-2-3 Modbus Data Transfer

Enable Modbus data transfer as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Adjust ROI capture settings (see Section 13-4-2-1-2 ROI Capture Settings).
3. Click the Properties icon of the preferred ROI to open its settings.
4. Click Modbus Server.
5. Check the boxes to choose data to transfer. More than one rule can be applied.
6. Use the input box(es) to define the address parameter(s).
7. Click OK to accept changes. Click Cancel to cancel changes.

13-4-2-4 DDE Client Transfer

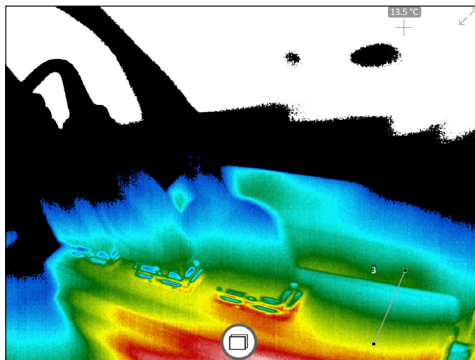
Enable DDE for transferring data between applications as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Adjust ROI capture settings (see Section 13-4-2-1-2 ROI Capture Settings).
3. Click the Properties icon of the preferred ROI to open its settings.
4. Click DDE Client.
5. Define application using the Application Name input box.
6. Define topic name using the Topic Name input box.
7. Click Connect.
8. Check the boxes to choose data to transfer. More than one rule can be applied
9. Use the input box(es) to define the Item Name parameter(s).
10. Click OK to accept changes. Click Cancel to cancel changes.

13-4-3 Isotherms

An Isotherm is a definable, high-contrast overlay that allows users to locate regions exhibiting similar temperatures or highlight and define hot/cold regions of monochromatic images. Isotherms generally locate areas of constant or equal temperature. These areas are defined by setting a minimum and maximum temperature.

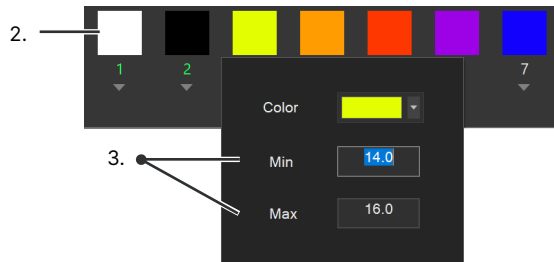
Isotherms are useful for locating regions where the temperature of an object remains constant. They can also be used to block out non-essential data.



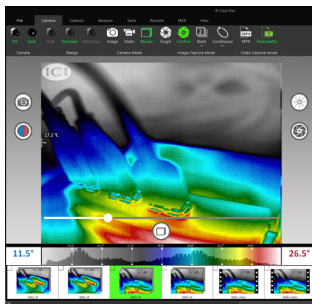
13-4-3-1 Create an Isotherm

Users can create Isotherms to gather block out data during thermal investigations. Add a Isotherm to an image as follows:

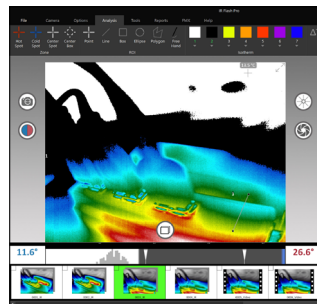
1. Click Analysis from the Main Menu.
2. Toggle Isotherms on by clicking the squares of color. The number underneath highlights green when active. Toggle off Isotherm by clicking the square of color a second time.
3. Define minimum and maximum temperature range(s) for active Isotherm(s). by clicking the drop-down arrow and filling in the values. Isotherms automatically generate.



Before



After



13-4-3-2 Delete an Isotherm

Deactivate an Isotherm by clicking the square of color of an active Isotherm. The number underneath the Isotherm turns white when deactivated.

13-5 Delta T

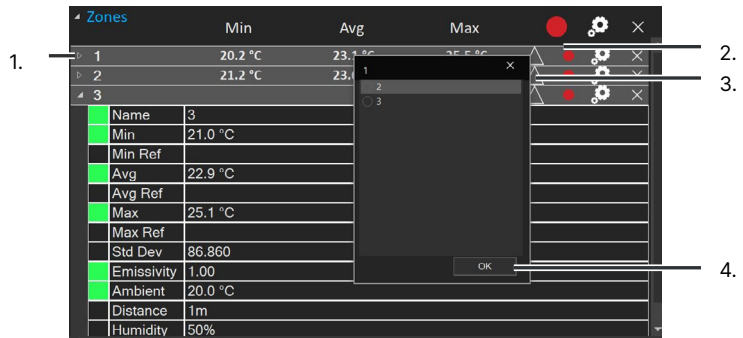
Delta T, or the difference between two temperature values, is one of the most commonly used measurements in the infrared industry. Monitoring Delta T over time can give clues to things like sub-optimal system performance, unnecessary energy usage or impending equipment failure, helping users address issues proactively instead of reactively.

13-5-1 Calculating Delta T

Calculating Delta T on paper is simple: subtract one temperature value from another temperature value. The difference, or delta, between the two is Delta T. IR Flash Pro has a built-in tool to help calculate Delta T for the user. Calculations can be performed for one image or during the cross comparison of two images.

Calculate the difference in temperature as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Click the Delta T icon of the preferred temperature value. A menu opens.
3. Select a second temperature value. Only one value can be selected.
4. Click OK. A new ROI is created noting the Delta T.



Zones			
	Min	Avg	Max
1	20.2 °C	23.1 °C	25.5 °C
2	21.2 °C	23.6 °C	26.1 °C
3	21.0 °C	22.9 °C	25.1 °C
DT: 1 - 2			
Name	1	2	
Min	20.2 °C	21.2 °C	-1.1 °C
Avg	23.1 °C	23.6 °C	-0.6 °C
Max	25.5 °C	26.1 °C	-0.6 °C

Delta T

13-6 Temperature Alarms

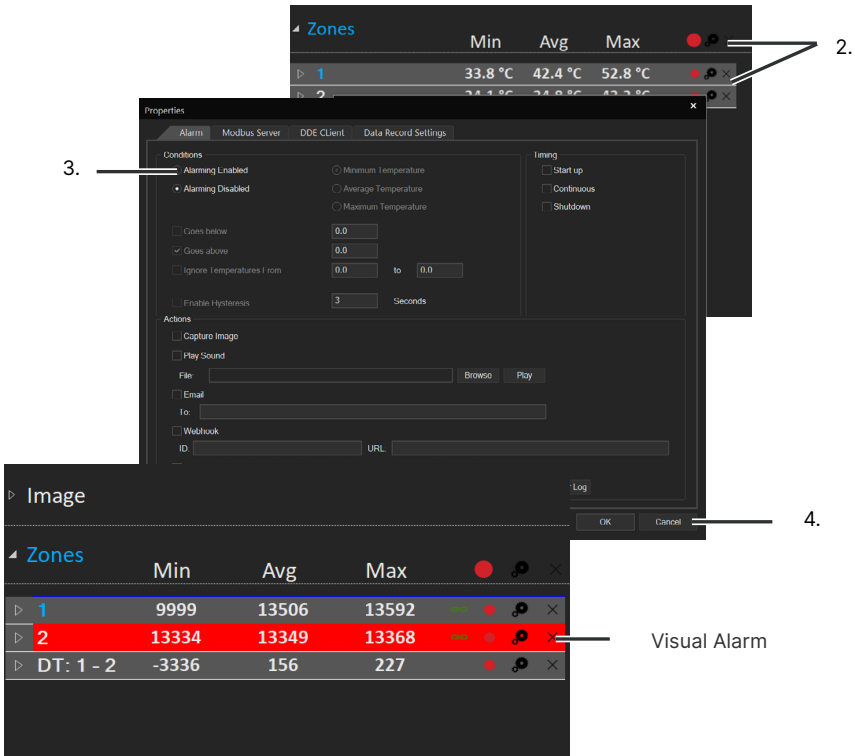
13-6-1 Enable an Alarm

By default the temperature alarms are disabled. When enabled alarms trigger a visual alarm which flashes red/blue and an audible beep is heard. Grey alarms are normal.

Enable alarms as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Click the Properties icon of the preferred ROI to open its settings; or click the Global Properties icon to open settings for all ROI. The alarm tab opens by default.
3. Click Alarming Enabled to enable an alarm. Click Alarming Disabled to disable an alarm.
4. Click OK to accept changes. Click Cancel to cancel changes.

In some cases, Global Properties may override ROI settings, e.g. if Zone #1 is set to alarm but the Global Properties are disabled the alarm may not sound.

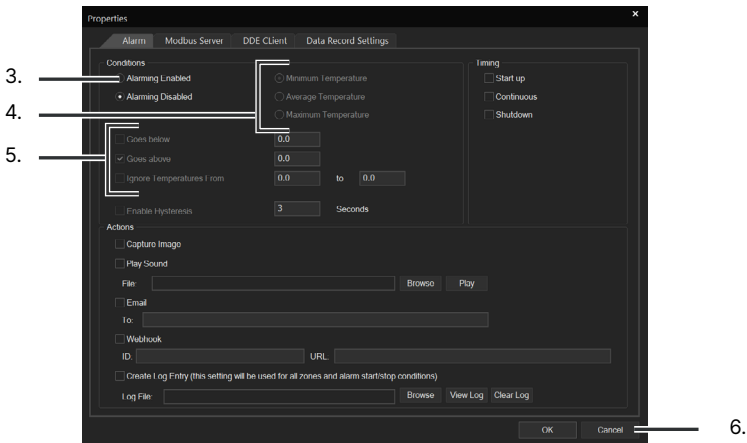


13-6-2 Conditions

The alarm conditions define the event that triggers the alarm. When an alarm triggers the associated ROI flashes red/blue in the Project Information/Zones area. Grey ROIs are normal.

Set the alarm conditions as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Click the Properties icon of the preferred ROI to open its settings; or click the Global Properties icon to open settings for all ROI. The alarm tab opens by default
3. Click Alarming Enabled to enable an alarm. Click Alarming Disabled to disable an alarm.
4. Choose temperature parameter:
 - **Minimum** - conditions are based on the lowest temperature detected;
 - **Average** - conditions are based on the average temperature detected;
 - **Maximum** - conditions are based on the highest temperature detected;
5. Check the boxes to choose rule(s). More than one rule can be applied:
 - **Goes Below** - An alarm triggers when the temperature parameter falls below the defined threshold;
 - **Goes Above** - An alarm triggers when the temperature parameter rises above the defined threshold; and/or
 - **Ignore Temperatures From** - Alarm triggers ignore temperature that fall between the defined range.
6. Use the input box(es) to define the temperature threshold(s).
7. Click OK to accept changes. Click Cancel to cancel changes.



13-6-2-1 Hysteresis

Hysteresis works with the high and low alarm thresholds to tell the device when to keep an alarm on without sending additional alarm reports, or when to shut off an alarm. Enabling the hysteresis settings can help prevent erratic alarm triggers and shut offs.

Enable hysteresis as follows:

1. Create ROIs (see **Section 13-4-1-2-1 Create an ROI**).
2. Click the Properties icon of the preferred ROI to open its settings; or click the Global Properties icon to open settings for all ROI. The alarm tab opens by default
3. Click Alarming Enabled to enable an alarm. Click Alarming Disabled to disable an alarm.
4. Check the box next to Hysteresis to enable the feature; then, use the input box to define the alarm event threshold.
5. Click OK to accept changes. Click Cancel to cancel changes.

13-6-3 Timing

Timing controls when alarm actions occur.

Set the alarm timing as follows:

1. Create ROIs (see **Section 13-4-1-2-1 Create an ROI**).
2. Click the Properties icon of the preferred ROI to open its settings; or click the Global Properties icon to open settings for all ROI. The alarm tab opens by default
3. Click Alarming Enabled to enable an alarm. Click Alarming Disabled to disable an alarm.
4. Choose timing parameter:
 - **Start up** - action occur the moment an alarm is triggered;
 - **Continuous** - actions occur continuously for a alarm triggered; or
 - **Shutdown** - actions occur when the alarm is terminated.
5. Click OK to accept changes. Click Cancel to cancel changes.

ALARM ACTIONS WILL NOT OCCUR IF ALARM TIMING IS NOT SET.

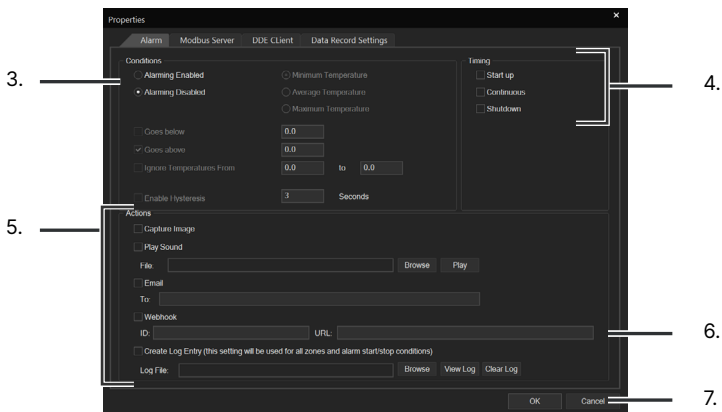
ALARM ACTIONS WILL NOT OCCUR IF ALARM TIMING IS NOT SET.

13-6-4 Actions

Alarms can trigger event actions such as capturing an image, playing a sound, forwarding an email, send webhook information, or log creation.

Set the alarm actions as follows:

1. Create ROIs (see Section 13-4-1-2-1 Create an ROI).
2. Click the Properties icon of the preferred ROI to open its settings; or click the Global Properties icon to open settings for all ROI. The alarm tab opens by default
3. Click Alarming Enabled to enable an alarm. Click Alarming Disabled to disable an alarm.
4. Choose timing parameter:
 - **Start up** - action occur the moment an alarm is triggered;
 - **Continuous** - actions occur continuously for a alarm triggered; or
 - **Shutdown** - actions occur when the alarm is terminated.
5. Check the boxes to choose action(s). More than one action can be applied:
 - **Capture Image** - Captures an image;
 - **Play Sound** - Plays a sound;
 - **Email** - Sends an email;
 - **Webhook** - Send information to a URL; and/or
 - **Create Log Entry** - Creates a log entry.
6. Use the input box(es) to define the action parameter(s).
7. Click OK to accept changes. Click Cancel to cancel changes.



13-7 Tools

A variety of tools are available to assist users in video conversion and image processing.

13-7-1 Video Conversion

Videos are recorded in IR Flash Pro containing radiometric infrared data which is useful for analysis and report building. These files are saved in ICI's proprietary V16 format which is quite large due to the radiometric data stored within.

In order to send videos to clients the user may need to convert them to the MP4 format. IR Flash Pro has a built-in feature for converting videos. MP4 videos do not contain radiometric data and thermal analysis cannot be retroactively applied to them.

Convert videos as follows:

1. Click Tools from the Main Menu.
2. Choose to convert a single video or all videos by clicking an icon:



Convert Radiometric
Video to MP4

or



Convert all Radiometric
Videos to MP4

MP4 VIDEOS DO NOT CONTAIN RADIOMETRIC DATA AND THERMAL ANALYSIS CANNOT BE PERFORMED ON THEM AFTER CONVERSION.

13-7-2 Image Conversion

IR Flash Pro has a built-in feature that allows users to convert a series of images into an MP4. The feature converts all infrared images into one non-radiometric video while converting any visible images into a separate video. This is useful for creating time-lapse media.

Convert images as follows:

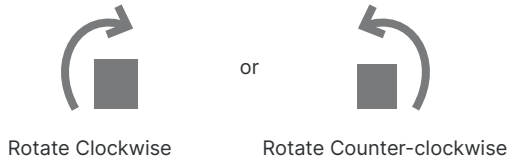
1. Click Tools from the Main Menu.
2. Click Convert Images to MP4 icon.

13-7-3 Image Processing

13-7-3-1 Rotate

Users can change the orientation of the Image Display Window by using the built-in rotation feature as follows:

1. Click Tools from the Main Menu.
2. Choose to rotate image clockwise or counter-clockwise by clicking an icon:

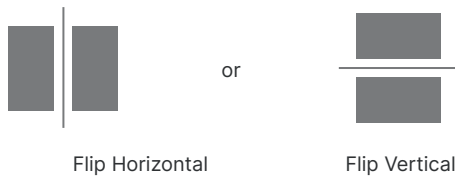


The Image Display Window image turns 90° in the chosen direction. Four clicks is 360° and resets the image to the original setting.

13-7-3-2 Flip

Users can flip Image Display Window on either the horizontal or vertical axis as follows:

1. Click Tools from the Main Menu.
2. Choose to flip image horizontally or vertically by clicking an icon:



The Image Display Window image flips 180° in the chosen direction. Two clicks is 360° and resets the image to the original setting.

13-7-3-3 Apply Palette to all Images

A preferred polarity (color palette) can be applied to all images in a series as follows:

1. Click Tools from the Main Menu.
2. Click Apply Palette to all Images icon.

13-7-3-4 Apply Settings to all Images/Radiometric Videos

IR Flash makes it easy to apply Level & Span and polarity settings to all the captured images/radiometric videos in a series. Do so as follows:

1. Click Tools from the Main Menu.
2. Click Apply Settings to all Images icon.

13-7-3-5 Image Enhancement

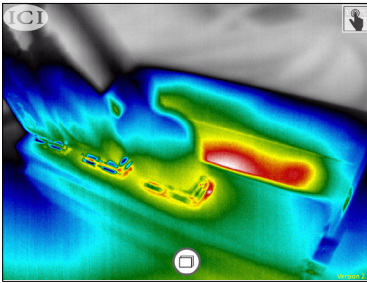
IR Flash includes image enhancement to sharpen images and videos. The feature makes it easier to identify objects and gain spatial awareness.

Apply image enhancement as follows:

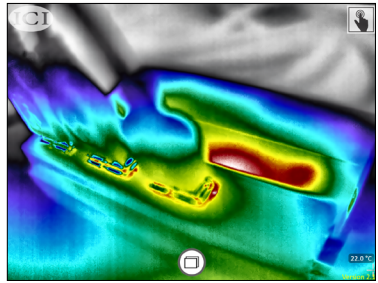
1. Click Tools from the Main Menu.
2. Click Image Enhancement icon. Feature highlights green when enabled. Click the Image Enhancement icon again to disable the feature.

Image Enhancement

Before

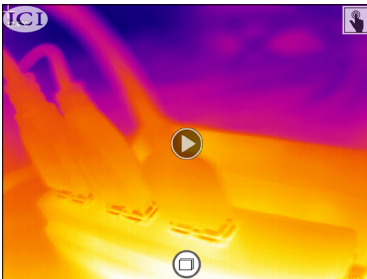


After

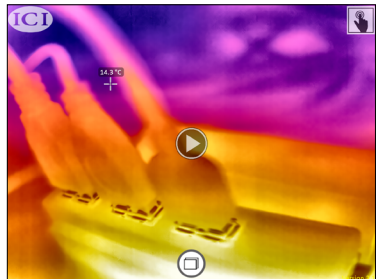


Video Enhancement

Before



After



13-7-4 Image Processing

13-7-4-1 Enhanced Mode

Enhanced Mode provides video magnification to enhance movement in the Image Display Window. It is most useful to detect small leaks with Mirage series cameras or other gas detecting infrared cameras made by ICI. Toggle on/off Enhanced Mode as follows:

1. Click Tools from the Main Menu.
2. Click Enhanced Mode icon. Feature highlights green when enabled. Toggle off by clicking the icon a second time.



13-7-4-2 Toggle TDLAS

Users have the ability to display or hide methane data from the Sensor Control Module Vapor 55 server. When toggled on, methane data collected by the imager displays at the top of the Image Display Window. Toggle on/off methane data as follows:

1. Click Tools from the Main Menu.
2. Click Toggle TDLAS icon. Feature highlights green when enabled. Toggle off by clicking the icon a second time.



Example:



13-7-4-3 GPS/TDLAS Data Recording

This feature starts/stops the live data recording from the GPS and TDLAS. Currently, ICI only supports Adafruit GPS to record meta-data. After being enabled, the longitude, latitude, altitude, and direction of travel is automatically recorded. IR Flash Pro records the data in the CSV and KMZ format. The data is stored in the session folder of the project. The user can plug up to two GPS and TDLAS at the same time.

Toggle on/off GPS/TDLAS Data Recording as follows:

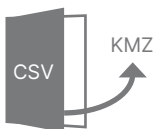
1. Click Tools from the Main Menu.
2. Click GPS/TDLAS Data Recording icon. Feature highlights green when enabled. Toggle off by clicking the icon a second time.



13-7-4-4 CSV to KMZ

The Sensor Control Module, used with many of ICI's infrared systems, captures GPS/TDLAS data in a CSV file. The user can convert the CSV files to KMZ allowing them to be opened in 3rd party software like Google Earth. Convert CSV to KMZ as follows:

1. Click Tools from the Main Menu.
2. Click CSV to KMZ icon.



3. Find and select preferred file to convert.
4. Click Open. File is automatically converted to KMZ format.
5. Click Ok to close the confirmation dialog box.

Users can find the KMZ file in the same folder containing the original CSV file. This file can then be used in 3rd party software.

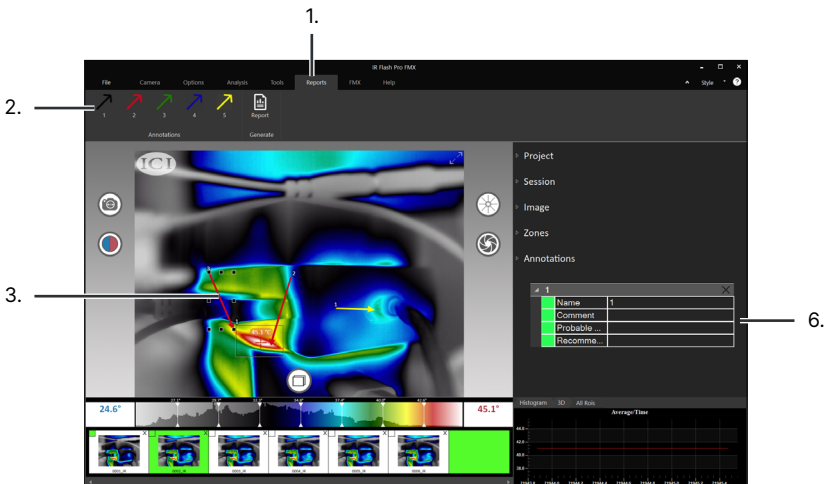
13-8 Report Building

13-8-1 Annotations

Users can further highlight areas of interest by annotating arrows drawn on the Image Display Window. IR Flash Pro has 5 color options for drawing arrows. Users can use the same color to make all their annotations or create a color coded system using the available color options.

13-8-1-1 Create an Annotation

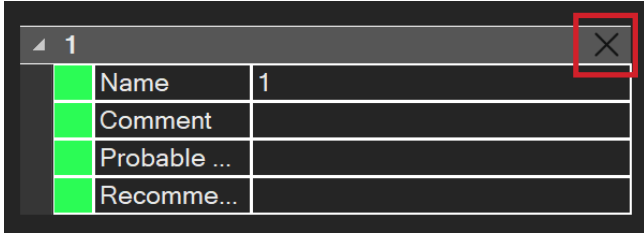
1. Select a captured image or video from the Captured Images Gallery by clicking it. The program enters Review Mode.
2. Click Reports from the Main Menu.
3. Choose annotation color by clicking an arrow.
4. Click and drag to draw an arrow on the Image Display Window. Wherever the user clicks is where the arrowhead starts. For touchscreens, press and hold; then, drag to create arrows.
5. Click Yes to add annotation to the corresponding visible image (if applicable). Click No to place annotation on infrared image only. A new section titled Annotations appears in the Project Information area.
6. Use the input fields to define a name for the annotation as well as other critical information including probable cause of the issue and recommended fixes. Add comments to provide clarification.



USERS CAN FIND INFORMATION ON MOVING AND RESIZING ANNOTATIONS IN SECTION 11-6-1-2 THROUGH SECTION 11-6-1-3.

13-8-1-2 Delete an Annotation

Created annotation can be found in the Annotations section of the Project Information area. An annotation can be deleted by clicking the “X” in the upper right corner of the corresponding annotation. Deleted annotations can not be recovered and the information previously created does not appear on generated reports.



13-8-2 Generate a Report in Research Mode

PDF reports can be generated using the built-in tools:

1. Create Regions of Interest (ROI) (see Section 13-4-1 Zones and Regions of Interest).
2. Toggle on/off ROI data to include in the report by visiting the Project Information/Zones area. Click a square to toggle on the corresponding parameter. Square turns green when active. Toggle off Zones by clicking the square a second time.

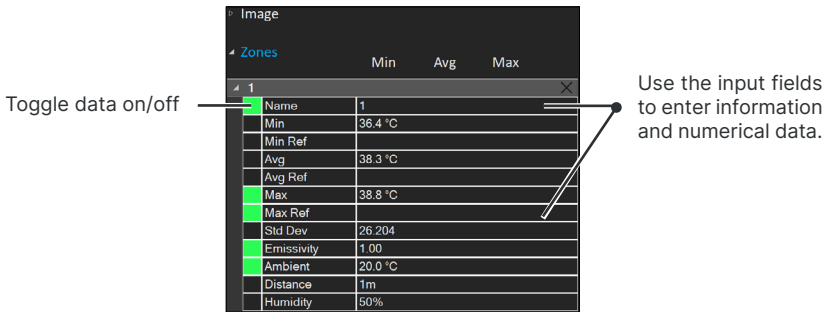
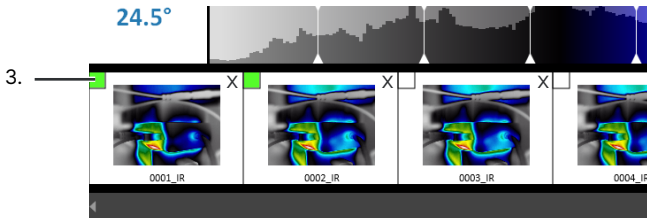
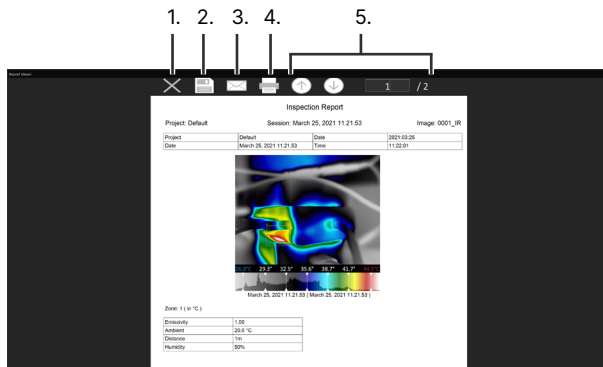


IMAGE DATA, I.E. INFORMATION FOR THE ENTIRE IMAGE, IS SEPARATE FROM REGION OF INTEREST DATA, INFORMATION STORED IN THE ROI CREATED BY THE USER. VISIT THE APPROPRIATE DROP-DOWN TAB TO INCLUDE PREFERRED INFORMATION IN THE REPORT.

3. Select image(s) from the Captured Images Gallery to use in report generation by clicking the white box in the corner of the preferred image(s). Box turns green when selected:



4. Click Reports from the Main Menu.
5. Create annotations, if preferred (see Section 13-6-1-1 Create an Annotation).
6. Click the Report button from the Reports Sub-menu.
7. Reports generate in a new window:



- | | | |
|----------|----------|-----------|
| 1. Close | 3. Email | 5. Review |
| 2. Save | 4. Print | |

Each image selected in Step 3 generates on its own page in the report. If the user has a dual vision camera, i.e. an infrared camera with a built-in visible camera, a visible photo appears along side the infrared photo. Image data appears above the image(s). ROI data is shown beneath the captured image(s).

IMAGE DATA, I.E. INFORMATION FOR THE ENTIRE IMAGE, IS SEPARATE FROM REGION OF INTEREST DATA, INFORMATION STORED IN THE ROI CREATED BY THE USER. VISIT THE APPROPRIATE DROP-DOWN TAB TO INCLUDE PREFERRED INFORMATION IN THE REPORT.

13-8-2-1 Close a Report

Close a report without saving by clicking the “X” icon.

13-8-2-2 Save a Report

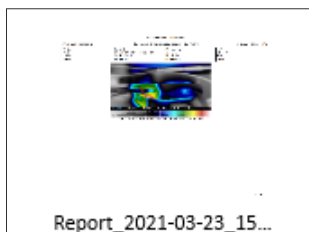
Generated reports are saved to the computer as follows:

1. Generate a report (see Section 13-6-2 Generate a Report in Research Mode).
2. Click the Save icon (floppy disk). Generated report save in PDF format to the current project folder located in the default save location. The default location for saving projects is:

C:\Users\XYZ\Documents\ICI\IRFlashPro\Projects\YYY

Where “XYZ” is the name of the user profile and “YYY” is the name of the project folder.

3. Generated report closes automatically. A report thumbnail appears in the Captured Images Gallery but cannot be opened in IR Flash Pro. Use a PDF viewer to view file.



THE USER MAY USE THE BUILT-IN FIND TOOL TO LOCATE THE SAVE LOCATION (SEE SECTION 7-2-2-3 FINDING THE SAVE LOCATION).

13-8-2-3 Delete a Report

Delete a report as follows:

1. Decide if the report should be erased.
2. Click the “X” in the upper right corner of the report to be deleted. A dialog box appears.
3. Click Yes to confirm deletion. Click No or Cancel to cancel deletion and close the dialog box.

13-8-2-4 Email a Report

Reports can be sent to clients directly from inside IR Flash Pro by using the email feature:

1. Generate a report (see Section 13-6-2 Generate a Report in Research Mode).
2. Click the Email icon (letter). A new window appear for the user to enter sender/receiver email addresses, a subject line, and a message. Reports are automatically attached to emails.
3. Click Send.

13-8-2-5 Print a Report

Print a hard copy of the report as follows:

1. Generate a report (see Section 13-6-2 Generate a Report in Research Mode).
2. Click the Print icon (printer). A new window appears for the user select an available printer and printer settings.
3. Click OK.

13-9 FMX Options

13-9-1 Focus

Some FMX series IR cameras have electronic focus instead of manual. This means the focus needs to be adjusted in the software. Be patient as the device can take several seconds to focus.

13-9-1-1 Auto Focus

This feature auto focuses or resets the focus of the infrared device.

1. Click FMX from the Main Menu.
2. Click Auto Focus. The camera automatically finds the best focal depth.

13-9-1-2 Focus Near

1. Click FMX from the Main Menu.
2. Press and hold the Focus Near button. Camera begins to focus.
3. Release the button when scene is in focus.

13-9-1-3 Focus Far

1. Click FMX from the Main Menu.
2. Press and hold the Focus Far button. Camera begins to focus.
3. Release the button when the scene is in focus.

13-9-2 Zoom

The zooming features are specific to FMX series IR cameras and cannot be used by other infrared devices. Clicking either button adjusts the interpolation by the selected amount. Be patient as the device can take several seconds to adjust.

13-9-3 Change the IP Address

IN SOFTWARE IP ADDRESS FEATURES ARE COMING SOON.

13-9-3-1 FMX 320/FMX640 Manual IP Address Configuration

FMX Series cameras come configured with static IP address for the infrared camera. There is no need to set a gateway as this is a direct connection from the computer to the cameras with no router. Configure as follows:

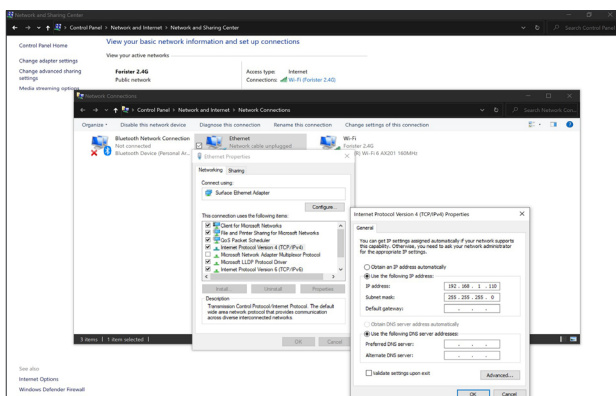
1. Click Windows icon.
2. Click Settings.
3. Click on Network and Internet.
4. Click Ethernet.
5. Click Change Adapter Settings.
6. Right click Ethernet and choose properties. For touchscreens, press and hold until a box pops up; then, release hold.
7. Double-click on Internet Protocol Version 4 (TCP/IPv4) Properties.
8. The IP address should read 192.168.10.110. If it does not, click in the box and fill in the correct number.
9. The Subnet Mask should read 255.255.255.0. If it does not, click in the box and fill in the correct number.
10. Click OK.

THESE STEPS SHOULD ONLY BE PERFORMED BY A TECHNICAL SUPPORT SPECIALIST. CALL CUSTOMER SUPPORT FOR ASSISTANCE.

13-9-3-2 FMX 400 Manual IP Address Configuration

The FMX 400 comes configured with static IP address for the infrared camera. There is no need to set a gateway as this is a direct connection from the computer to the cameras with no router. Configure as follows:

1. Click Windows icon.
2. Click Settings.
3. Click on Network and Internet.
4. Click Ethernet.
5. Click Change Adapter Options.
6. Double-click Ethernet.
7. Click Properties.
8. Double-click on Internet Protocol Version 4 (TCP/IPv4) Properties.
9. The IP address should read 192.168.1.110. If it does not, click in the box and fill in the correct number.
10. The Subnet Mask should read 255.255.255.0. If it does not, click in the box and fill in the correct number.
11. Click OK.



14. Adding T-Cam Images to IR Flash Pro

Users can import T-Cam series images into IR Flash Pro, but functionality is limited. Convert images to videos, enable image enhancement for all media, create annotations, and generate reports using the software.

Image polarity cannot be changed and analysis cannot be performed since T-Cam images are saved in a non-radiometric JPG format.

14-1 Import T-Cam Images

Users can import sessions into projects as follows:

1. Click Import from the Projects Menu.
2. Select Project.
3. Click Import Session. A new window opens.
4. Browse for session.
5. Select session by clicking on its folder.
6. Click OK.

The Projects Screen switches over to the Research Mode interface allowing the user to begin or edit their session.

USERS CAN ONLY IMPORT ONE SESSION AT A TIME.

15. Radiometry

15-1 Introduction to Radiometry

The basic reason for employing image processing programs when analyzing IR images is to have a fast and comprehensive means to determine the information content of an image in numerical terms. Radiometry is considered the base from which to conduct this analysis.

Typically, converting the gray scale values to values of temperatures requires either a calibration of individual cameras or field calibration data. The method for calibrating images provided in this program is camera dependent because temperature calibration data is collected through an advanced calibration process at the factory and installed within the software program.

IR Flash Pro looks for a very specific file in its structure and mates that with the camera serial number automatically read by the program. If this software cannot match the camera to the calibration file, the user cannot perform temperature analysis on the data. Contact customer service if there is an issue.

IF YOUR PACKAGE INCLUDES ADDITIONAL LENSES A SEPARATE CALIBRATION IS REQUIRED FOR EACH LENS. CONTACT CUSTOMER SERVICE IF THERE IS AN ISSUE.

15-2 Radiometry Correction

The accuracy of temperature conversion is also dependent on the physics of the scene. These physical properties include humidity, emissivity and reflection of the target, the transmission in the intervening atmosphere, and the background/foreground temperature within the scene.

Information for an image is stored in the Project Information/Zones area and can be retrieved by clicking the drop-down tab next to "Image". ROI data is stored under "Zones". The dialog box shown below allows users to offset potential errors by typing precise values into the input field next to the property:

Users can include data in reports. To toggle data on/off click the squares. Boxes are green when selected.

Image			
Zones			
	Min	Avg	Max
1			
Name	1		
Min	36.4 °C		
Min Ref			
Avg	38.3 °C		
Avg Ref			
Max	38.8 °C		
Max Ref			
Std Dev	26.204		
Emissivity	1.00		
Ambient	20.0 °C		
Distance	1m		
Humidity	50%		

Use the input fields to enter information and numerical data.

IMAGE DATA, I.E. INFORMATION FOR THE ENTIRE IMAGE, IS SEPARATE FROM REGION OF INTEREST DATA, INFORMATION STORED IN THE ROI CREATED BY THE USER. VISIT THE APPROPRIATE DROP-DOWN TAB TO INCLUDE PREFERRED INFORMATION IN THE REPORT.

15-2-1 Detail Parameters

Name, Date, and Time information is automatically recorded and stored when media is captured. Images have a default name of "XYZ_IR" where "X" is a series of numbers. Users can enter notes in the Comments section. Location/GPS is captured if enabled.

15-2-2 Emissivity

Users are provided the capability to enter any value of surface optical property of the target surface deemed appropriate to the analysis. To set the emissivity enter a value from 0.01 to 1.0 in the input box.

The accompanying table gives the typical emissivity of important materials:

Material	Emissivity
Water	.96
Stainless steel	.14
Aluminum plate	.09
Asphalt	.96
Concrete	.97
Cast iron	.81
Rubber	.95
Wood	.85
Brick	.75
Tape	.96
Brass plate	.06
Human skin	.98
PVC plastic	.93
Polycarbonate	.80
Oxidized copper	.78
Rust	.80
Paint	.90
Soil	.93

AS THE EMISSIVITY VALUE BECOMES LOWER THE ERROR BETWEEN THE ACTUAL SURFACE TEMPERATURE OF THE OBJECT AND THAT SHOWN BY THE CAMERA BECOMES GREATER. A GREAT DEAL OF ERROR CAN BE INTRODUCED INTO THE CALCULATION PROCESS IF YOU ARE NOT CAREFUL WITH THE EMISSIVITY SPECIFICATION.

15-2-3 Ambient Temperature

The Ambient Temperature, which is often referred to as the background, is the temperature of the air surrounding the target object. This number can affect surfaces whose energy hits the face of the target object and reflects off it into the camera's field of view.

Entering a numerical value in the appropriate input box adjusts the temperatures of an image accordingly.

15-2-4 Distance and Angle of Capture

Although distance usually does not affect the temperatures measured by the software it can be helpful to know the distance to the target location. Generally, the further away the IR sensor is from the target/background area, the less thermal contrast seen in the image.

Angles of reflection can also affect the contrast. This is significant because when the IR sensor is operated at low angles over water there may be no perceived thermal difference between the horizon and the water, i.e. the horizon can seem to disappear. Users can change their angle by changing where they stand or by attaching a camera to an unmanned aerial system.

While there is an input box for Distance there is not an input for Angle. Use the Comments section to create notes.

15-2-5 Humidity

Humidity remains in the atmosphere even on bright days. Water of all three states can be found naturally in the atmosphere: liquid (rain, fog, and clouds), solid (snowflakes, ice crystals), and gas (water vapor). Water in any state is an obstacle to accurate temperature measurements. When the wave passes through the water particles, a part of its energy is absorbed and a part is scattered. Therefore the electromagnetic wave is attenuated.

Users can correct for atmospheric attenuation due to humidity by defining the value using the input field.

Users can include data in reports. To toggle data on/off click the squares. Boxes are green when selected.

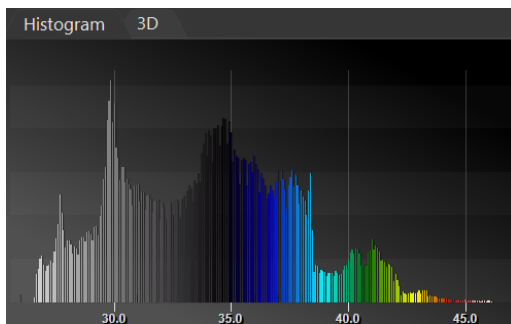
Image	
Zones	
	Min Avg Max
1	
Name	1
Min	36.4 °C
Min Ref	
Avg	38.3 °C
Avg Ref	
Max	38.8 °C
Max Ref	
Std Dev	26.204
Emissivity	1.00
Ambient	20.0 °C
Distance	1m
Humidity	50%

Use the input fields to enter information and numerical data.

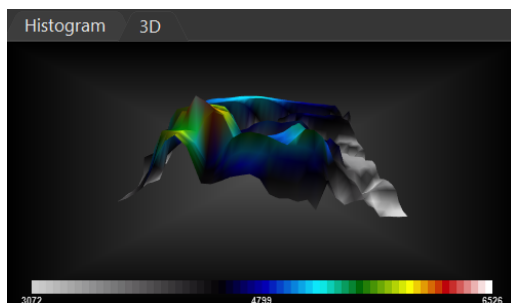
15-3 Histograms & Graphs

The bottom right corner of the screen plots image information in the form of a histogram or a 3D rendering. It also allows users to visualize the temperature data over time for any/all ROIs plotted on the image; the last image below shows a plot for three Regions of Interest.

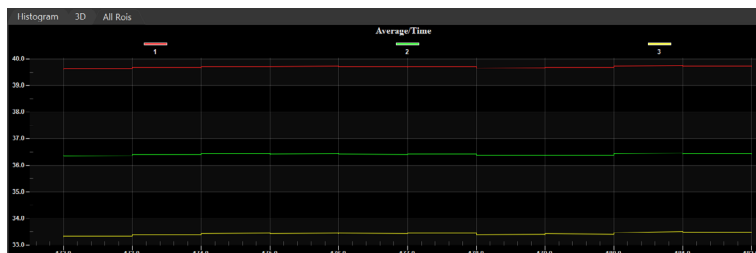
Histogram



3D Rendering



Data Over Time (ROI)



16. Cleaning and Maintenance

16-1 Cleaning the Germanium Lens of the Device

Do not use corrosive chemicals on the optical glass components of infrared devices. The germanium window surface is coated with anti-reflection coating. Dust, grease, and fingerprints produce harmful substances and lead to a decline in performance, or cause scratches. If dirt is found, please use the following methods:

1. Use a blown balloon or a soft brush to clean the lens surface to avoid dust particles scratching the anti-reflection film on lens surface during the wiping process.
2. Use a soft cotton or microfiber cloth or lens wiping paper and dip in distilled water. Gently wipe the lens surface from the middle to the edge, paying attention to not crack the lens, or use too much liquid. If the lens is still not clean, replace the cloth and repeat the wiping process.

16-2 Disinfecting the Camera Surface

Do not use corrosive cleaning solutions on the optical glass components. It is recommended to disinfect the camera surface regularly with a non-corrosive sanitizing product. Follow the directions provided by the manufacturer of the cleaning solution. Adhere to the sanitation protocols and cleaning schedule set forth by the employer.

16-3 Device Calibration

It is recommended to have the device(s) re-calibrated annually. Contact customer service to schedule maintenance.

16-4 Storage

When the equipment is not in use, the device should be placed in a dust-free and moisture-free environment with a stable temperature and humidity.

DO NOT USE CORROSIVE CLEANING SOLUTIONS ON THE OPTICAL GLASS COMPONENTS. DISINFECT THE CAMERA SURFACE REGULARLY WITH A NON-CORROSIVE SANITIZING PRODUCT.

CALIBRATE YOUR DEVICES ANNUALLY. CONTACT CUSTOMER SERVICE TO SCHEDULE MAINTENANCE.

17. Troubleshooting

If the user encounters any problems while using the imager, refer to the following options. If the problem persists, disconnect the power and contact the customer support department.

17-1 Camera(s) not showing, camera(s) lagging, or software crashing

- Close and reopen software
- Reconnect power & USB cables
- Ensure that camera has been powered on for a few minutes
- Restart computer
- Verify that correct software is installed
- Uninstall & reinstall software, running as administrator
- Verify that firewall is not blocking software
- Try newer or different version of IR Flash

17-2 The attached camera shuts off unexpectedly

- Replace old battery
- Charge battery

17-3 No thermal image from attached camera

- Open the lens cap
- If lens is foggy, use professional equipment to clean the lens

17-4 Unclear or dark visible images from attached camera

- Turn on lights in imaging area
- Turn on device light
- If lens is foggy, use professional equipment to clean the lens

CALIBRATE YOUR DEVICES ANNUALLY. CONTACT CUSTOMER SERVICE TO SCHEDULE MAINTENANCE.

17-5 Attached camera is out of focus

- For FMX devices, use the focus settings of the software
- For devices with focus lens adjusters, turn the adjuster right or left
- For devices without focus lens adjusters, change the distance between camera and subject

17-6 Temperature data is missing or has strange readings

- Close and reopen software
- Camera has to be powered on for 15 minutes 5 to 10 minutes before measuring temperatures
- Ensure camera is away from direct sunlight
- Try newer version of IR Flash software

17-7 Temperature readings are incorrect

- Turn off the device; then, turn it back on
- To ensure the accuracy of temperature measurement, you are recommended to wait for 5 to 10 minutes after turning on the thermal imager and before measuring temperatures.
- Ensure the correct temperature range is selected
- Device is at proper height
- Device is at proper angle
- Ensure device is in focus
- Adjust emissivity
- Adjust humidity
- Adjust for ambient temperature
- Wait for or perform a manual NUC operation
- Send the device in for recalibration

17-8 Memory card error

- Clear temporary files
- Perform a disk cleanup

18. About ICI

ICI manufactures complete systems and software. We can provide complete engineering, software, and OEM solutions. Our Fortune 500 clients rely on us for infrared equipment and thermography training (which we offer through the Infrared Training Institute).

In addition to providing custom germanium, silica, and sapphire optics, we also build windows for enclosures, as well as custom pan and tilt units. We can even provide customizable explosion-proof systems.

Our knowledge and experience stems from years of using infrared imaging and temperature measurement instruments to provide solutions to: managers, engineers, scientists, inspectors and operators in space, power companies, medical, pulp and paper, food industry, research and development, and various process industries. You can see our products and services used in industrial, commercial, and government applications worldwide. Additionally, our ICI 7320 was awarded "Product of the Month" by NASA*. Originally named Texas Infrared (still DBA), Infrared Cameras, Inc. has been in business since March, 1995.

Thank you for your dedicated and continued support.

Infrared Cameras, Inc.
2105 W. Cardinal Dr.
Beaumont, TX 77705

Phone: (409) 861-0788
Toll Free: (866) 861-0788
International: (409) 861-0788

Customer Support: support@infraredcameras.com
Website: www.infraredcameras.com

You may reach a customer care representative by phone or email during regular business hours: Monday – Friday 8:00AM - 5:00PM CST.

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