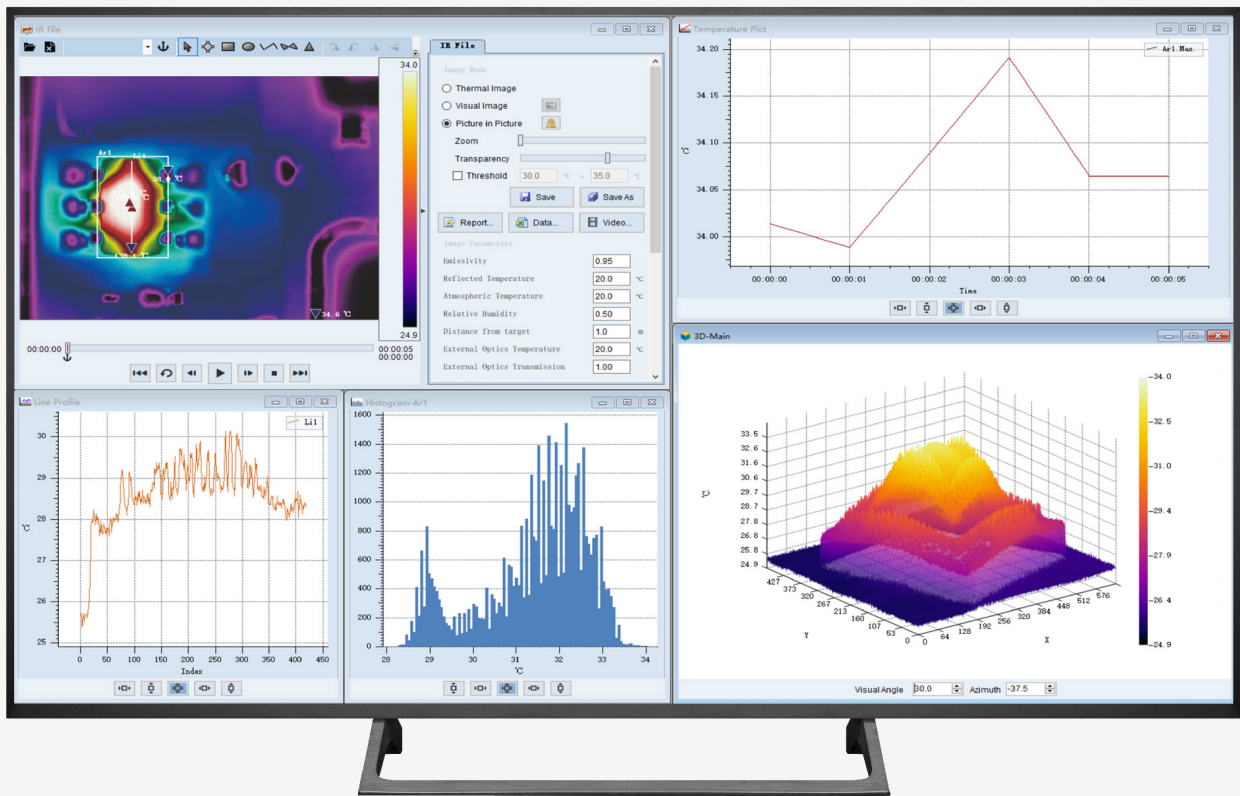


AnalyzIR

User Manual



Contents

Legal Disclaimer

| | |
|-----------------------------|---|
| 1.1 Legal Disclaimer | 1 |
| 1.2 Usage Statistics | 2 |
| 1.3 Copyright | 2 |
| 1.4 Quality Assurance | 2 |

Software Installation

| | |
|---------------------------------|---|
| 2.1 System Requirements | 4 |
| 2.2 Hardware Requirements | 4 |

User Interface (UI)

| | |
|---|----|
| 3.1 IR Camera Workspaces | 6 |
| 3.1.1 Main User Interface Window | 6 |
| 3.1.2 IR Camera image Analysis Interface | 9 |
| 3.1.3 IR Camera Parameter Setting Panel | 15 |
| 3.1.4 Page Layout | 18 |
| 3.2 IR File Workspace | 19 |
| 3.2.1 Main User Interface Window | 19 |
| 3.2.2 IR File Workspace Analysis Interface | 20 |
| 3.2.3 Thermal Image Parameter Setting Panel | 25 |
| 3.2.4 Page Layout | 29 |
| 3.3 Report Template | 30 |
| 3.3.1 Set default template or cancel default | 30 |
| 3.3.2 Customize a report template | 31 |
| 3.3.3 Import, Export or delete report templates | 38 |
| 3.4 Batch Processing | 40 |
| 3.4.1 Convert Images | 40 |
| 3.4.2 Merge Images Into Video | 41 |
| 3.4.3 Generate Reports | 42 |
| 3.5 System Settings | 43 |

| | |
|-----------------------|----|
| 3.5.1 Common | 43 |
| 3.5.2 Display | 44 |
| 3.5.3 Save | 44 |
| 3.5.4 Trigger | 45 |
| 3.5.5 Units | 46 |
| 3.5.6 Languages | 47 |
| 3.6 Tools | 47 |
| 3.7 Help | 48 |

AnalyzIR Software Download

Appendix A

| | |
|------------------------|----|
| Emissivity Table | 50 |
|------------------------|----|

Legal Disclaimer

1.1 Legal Disclaimer

Uncooled thermal imaging products manufactured by FOTRIC are warranted with the assurance of after-sales service provided by FOTRIC from the date of initial purchase and delivery, provided such products must be handled under normal storage, use, and repair conditions and in accordance with FOTRIC operating instructions.

Uncooled thermal imaging manufactured by FOTRIC are entitled to 1-, 2-warranty (depending on the specific model) from the date of initial purchase and delivery. Warranty covers defects caused by materials and production processes, provided that such products are handled under normal storage, use, and repair conditions and in accordance with FOTRIC instructions.

Products not manufactured by FOTRIC but included in the system that FOTRIC sells to the original purchaser are covered by the specific supplier's warranty terms (if any) and FOTRIC is not liable for those products. This warranty is provided to the original purchaser and is not transferable. This warranty does not apply to any product that has been damaged by misuse, neglect, accident, or abnormal operating conditions. Consumable parts are not covered by this warranty.

Any defects in the products covered by this warranty must be reported and the product must not be used to prevent further damage. The purchaser must report any defects to FOTRIC immediately, otherwise this warranty will not apply.

If the product is proven defective in relation to materials or manufacturing after FOTRIC's inspection, it is up to the user whether it is to be repaired free of charge or replaced, provided that the product must be returned to FOTRIC within 3 months from above mentioned report date. FOTRIC has no obligation or liability for any defects other than those mentioned above. This product is exempt from any other warranties, expressed or implied. FOTRIC hereby disclaims any implied warranties of merchant-ability and applicability for a particular purpose. FOTRIC is not responsible for any direct, indirect, special, incidental or consequential loss or damage based on contract, civil, or any other legal theory. This warranty clause shall apply the relevant provisions of the laws of the People's Republic

of China. Any dispute or claim arising out of or related to this warranty shall be finally settled through arbitration in accordance with the rules of the Shanghai Pudong New District People's Court of the People's Republic of China. The place of arbitration shall be Shanghai.

1.2 Usage Statistics

FOTRIC reserves the right to collect anonymous usage statistics to help maintain and improve the quality of the software and services provided.

1.3 Copyright

No parts of this software (including source code) may be reproduced, transmitted, transcribed, or translated into any kind of language or computer language in any form or by electronic, electromagnetic, optical, manual ways, or any other means without the prior written permission of FOTRIC.

No parts of this document may be reproduced, photocopied, reprinted, translated, or transmitted to any readable electronic medium or machine without the prior written consent of FOTRIC.

The names and logos shown on the products herein are either registered trademarks or trademarks of FOTRIC and/or its affiliates. All other trademarks, trade names or company names referenced herein are for identification purposes only and are the property of their respective owners.

1.4 Quality Assurance

The quality management system for the development and production of these products in FOTRIC has been certified in accordance with the ISO 9001 standard.

FOTRIC is committed to a policy of continuous development, so we reserve the right to modify or improve any product without prior notice.

1.5 Export Control

Thermal imaging products are listed as export-controlled products by the U.S. Department of Commerce, United Nations Security Council (UNSC), and European Union (EU). This product contains a focal plane array and cannot be used in controlled countries (such as North Korea, Iran, Syria, Cuba, Sudan,

Russia, etc.), so please do not bring this product into or used in controlled countries. Any loss or liability arising from the above actions will be borne by you.

Software Installation

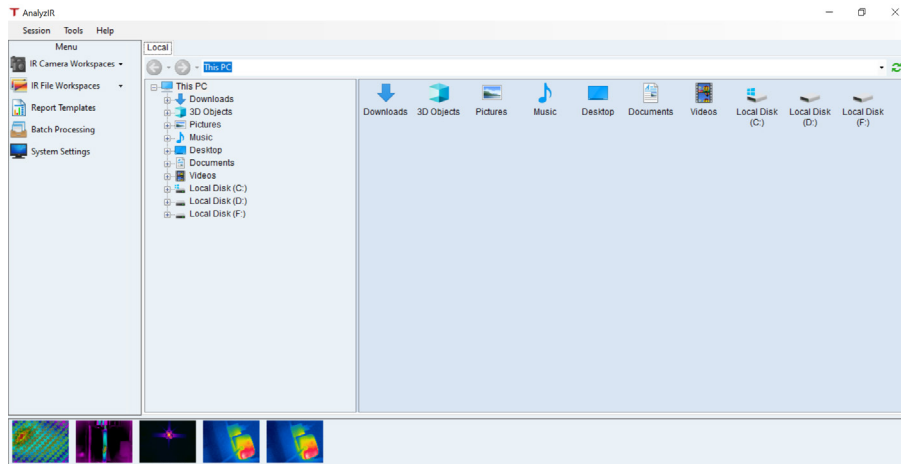
2.1 System Requirements


- Microsoft Windows XP (need to install .NET Framework 3.5, otherwise the program may not work properly)
- Microsoft Windows 7, 32-bit
- Microsoft Windows 7, 64-bit
- Microsoft Windows 10, 32-bit Professional Edition or higher version (need to enable .NET Framework 3.5 in Windows)
- Microsoft Windows 10, 64-bit Professional Edition or higher version (need to enable .NET Framework 3.5 in Windows)

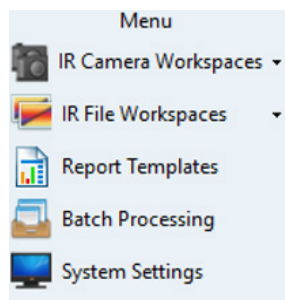
2.2 Hardware Requirements

- CPU: Intel Pentium IV 3.0 GHz or Higher performance
- Memory: 4G or more
- Display: 1024 × 768 or higher resolution

User Interface (UI)



- **AnalyzIR** Name of FOTRIC thermal image/video analysis software
-  Software control key (minimize, restore, and close)
- **Session Tools Help**
 1. Session: Menu of IR Camera Workspaces, IR File Workspaces, System Settings, and Quit
 2. Tools: Show report templates, batch processing, and data interface
 3. Help: Displays user manuals, product registration and some information about the software
- **Menu** Contains the following menus:



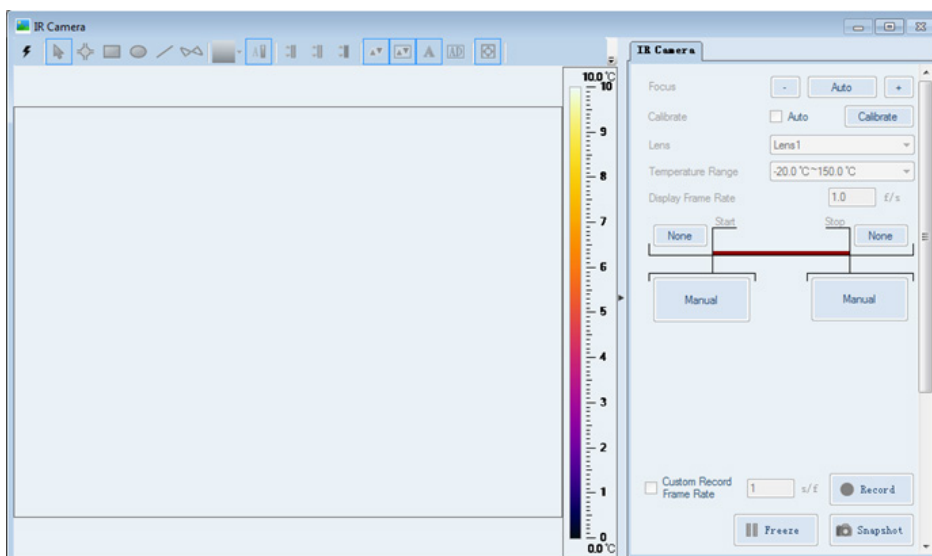
1. IR Camera Workspaces: Connect with an external device of a thermal imager

or load .IRS file for analysis

2. IR File Workspaces: Load .IRS file or thermal images for analysis
3. Report Templates: Import, export, or edit report templates
4. Batch Processing: Batch image conversion processing, video synthesis, and report generation
5. System Settings: Set up and modify system configuration parameters

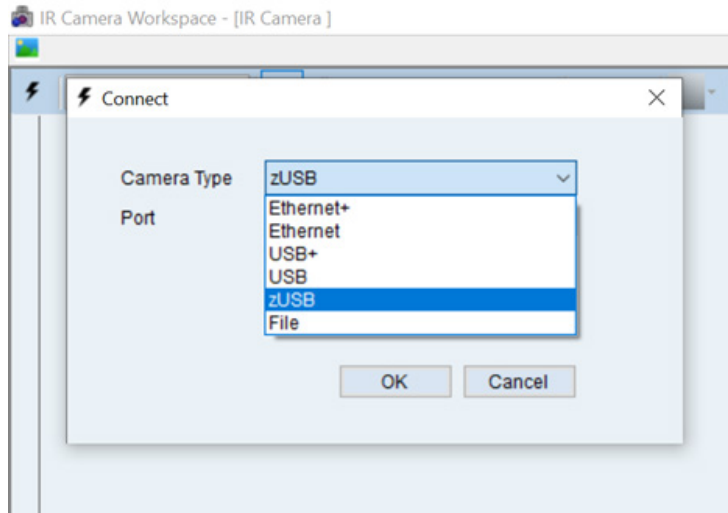
3.1 IR Camera Workspaces

3.1.1 Main User Interface Window

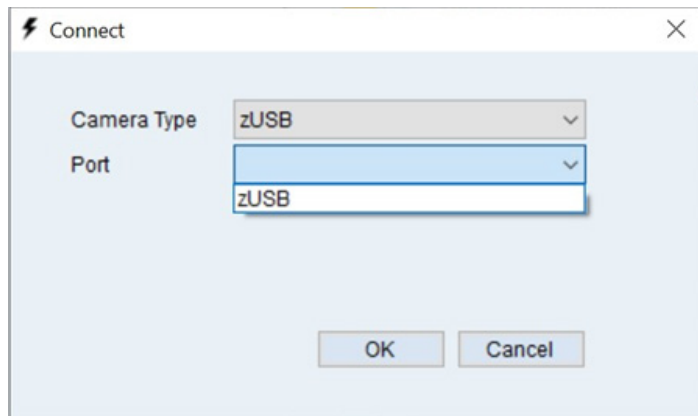


-  Open "Connect" window

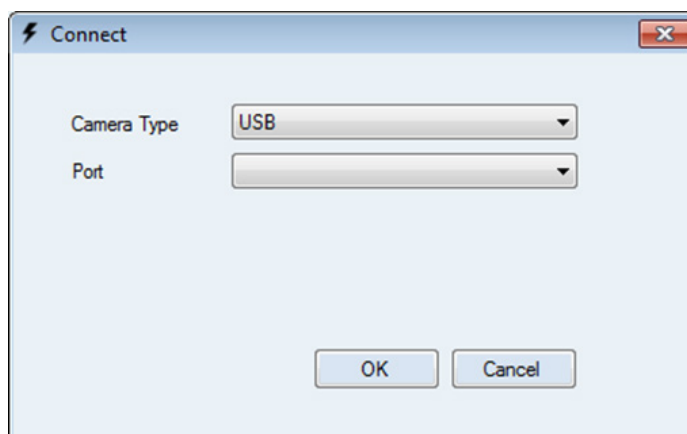
Connection camera types:



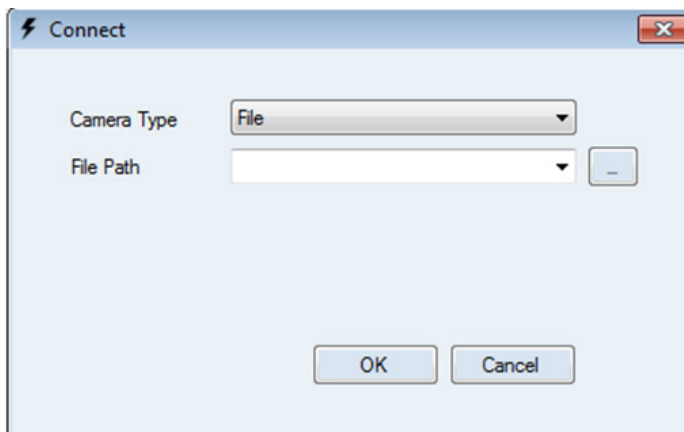
- For 340 series, select "zUSB" for external device; the "Port" number is automatically recognized as zUSB. Click OK to enter the workspace.



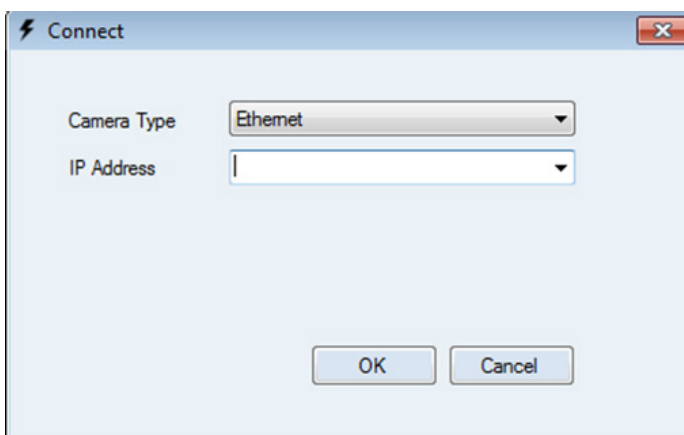
- for other portable types, Select USB or USB+ for external device; the "Port" number is automatically recognized. Click OK to enter the workspace.



- Select File and click to import .IRS file for analysis.

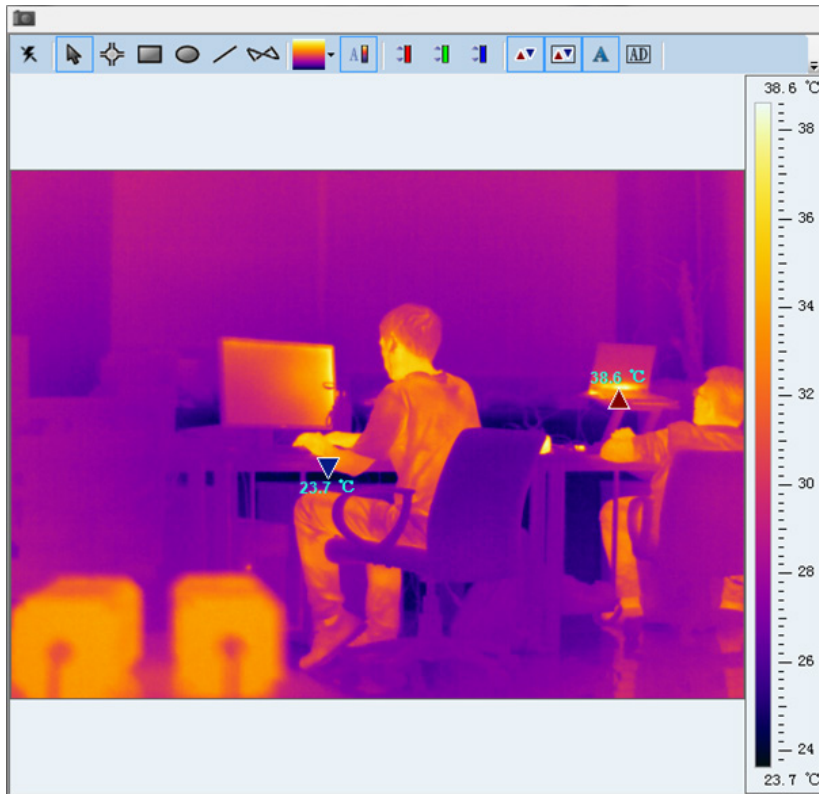


- Select Ethernet and enter the IP Address to connect with online equipment.



Note: Only registered users can connect to online equipment through the Ethernet.






3.1.2 IR Camera image Analysis Interface





-  Restore, move, size, minimize and maximize the analysis window

- 

Toolbar with different analysis tools

-  Disconnect
-  Arrow
-  Set spot and display the corresponding temperature value
-  Set rectangle and display the max., min., and average temperature values of this area (average temperature is the sum of temperature data of all points within the selected area divided by the number of points). It will track the location of max. and min. temperature automatically.
-  Set ellipse and display the max., min., and average temperature values



of this area (average temperature is the sum of temperature data of all points within the selected area divided by the number of points). It will track the location of max. and min. temperature automatically.

-  Set polyline and display the max., min., and average temperature values of this area (average temperature is the sum of temperature data of all points along the polyline divided by the number of points). It will track the location of max. and min. temperature automatically. You can draw a plot of the temperature distribution along the polyline.
-  Set polygon and display the max., min., and average temperature values of this area (average temperature is the sum of temperature data of all points within the selected area divided by the number of points). It will track the location of max. and min. temperature automatically.











Below is an example thermal image with various defined test areas.

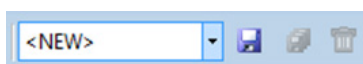


Note: You can move each spot or area to obtain the temperature information of the area.

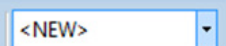


-  Choose color palette, including Grey, Iron, Rainbow, etc.
-  Temperature span (temperature scale range): Three (3) options are

available:

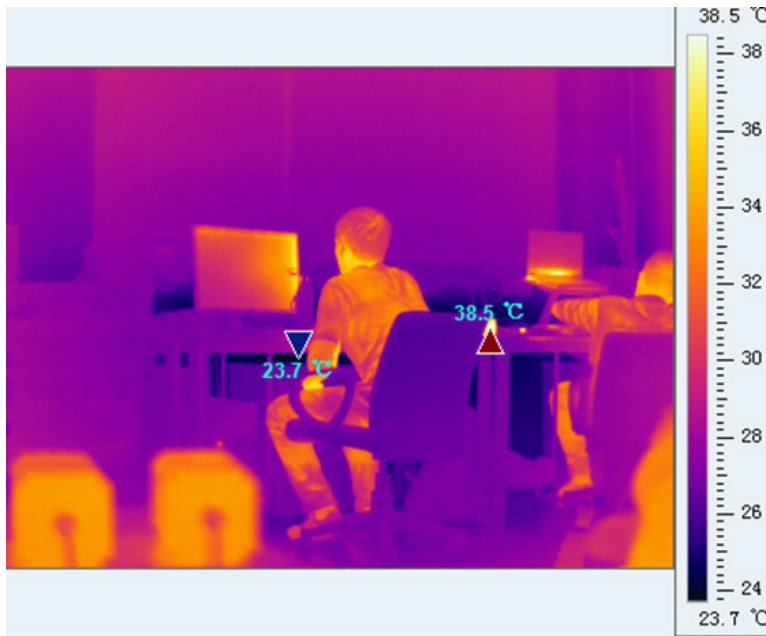
1.  Auto temperature span: The upper and lower limits are the maximum and minimum temperatures of the image. It requires minimum 8°C difference between the upper and lower limits in the scale.
 2.  Intelligent temperature span: Removes 5% non-obvious temperature point, improves the image contrast.
 3.  Fixed temperature span: Click the triangle to set the upper and lower limit of the scale, with a minimum 8°C difference.
-  Isotherm 1 – Click the triangle to set the upper and lower limit to highlight the areas in red with the desired temperature range.
 -  Isotherm 2 and 3 with different colors.
 -  Display max. and min. temperature of the selected measurement areas. Click the triangle mark to turn off or turn on the display.
 -  Display max. and min. temperature of the whole thermal image. Click the triangle mark to turn off or turn on the display.
 -  Turn on or turn off the display of temperature values.
 -  Turn on or turn off the display of AD values.
 -  Click to display the hidden tool when window is smaller



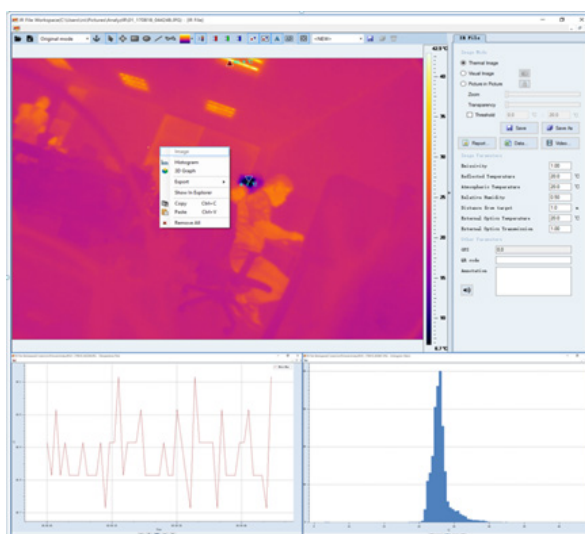
Name of the saved template

-  Save current screen settings as a template
-  Save current template as another template
-  Delete the selected template

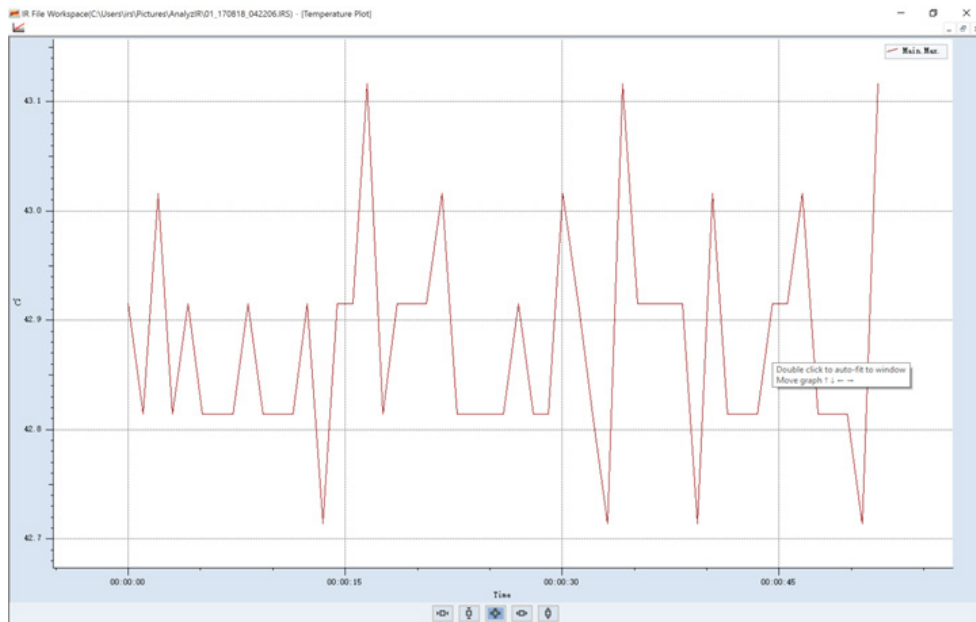
Thermal Image Display Area








- Temperature scale (temperature bar) is on the right side of the thermal image. When double clicked, it's automatically switched to fixed temperature span; you can change the upper and lower limit by dragging the mouse.
- Right click the image; you can generate the profile of temperature vs. time (temperature may vary with the time) and display the histogram graph (intuitive temperature distribution).



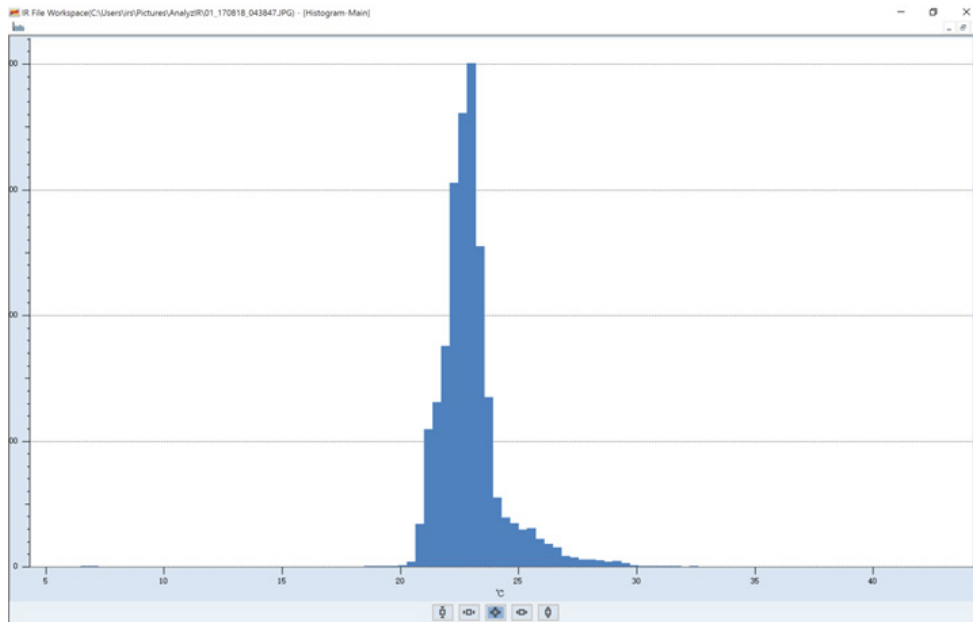
Temperature vs. time curve (max. temperature of the entire image as an example)



-  Zoom out the horizontal axis
-  Zoom out the vertical axis
-  Restore to the default axis setting
-  Zoom in the horizontal axis
-  Zoom in the vertical axis

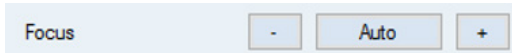
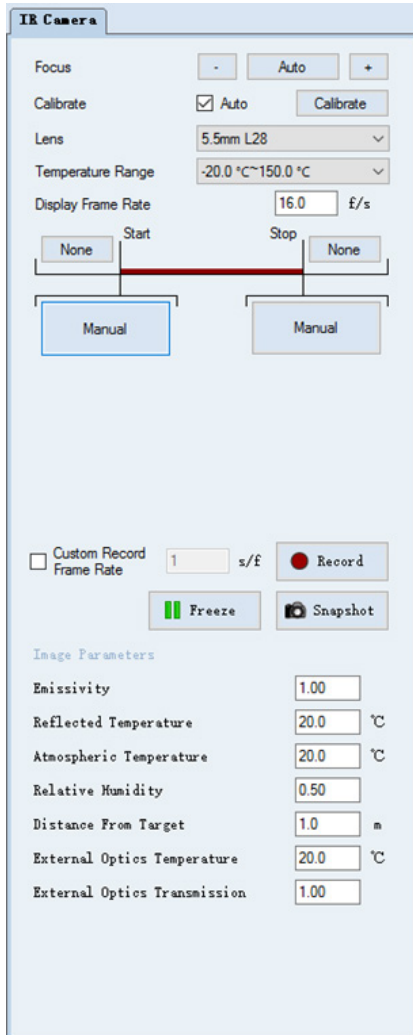
Same layout for both temperature curve and histogram plot. Name of the plot is displayed on the upper right corner.

- Histogram

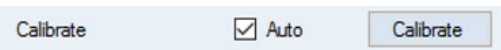


- Copy: Copy the position information of spot or area selections in the current thermal image, which can be copied to other files.
- Paste: Paste the copied information.
- Remove all: Remove all spot and area selections.

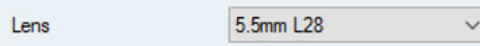
3.1.3 IR Camera Parameter Setting Panel



Auto focus, no need to set.



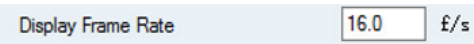
After the thermal camera is connected, click calibration to automatically start NUC.



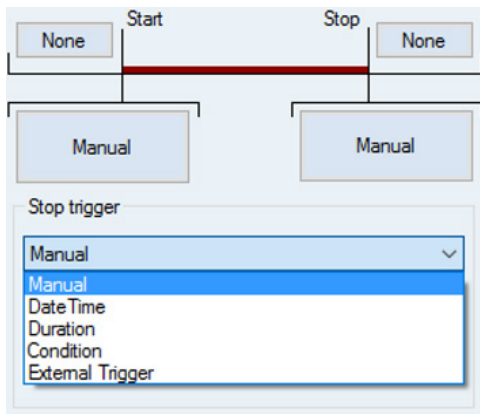
Select the lens. The default is the standard lens.



Select the temperature range according to the connected thermal camera, low-temperature range (-20 °C - 150 °C) and high-temperature range (0 °C - 650 °C).



Set up frames per second (1-60).



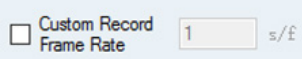





- Set up start and stop triggers to control the start and end of the thermal video recording.
- Manual: Manually trigger the device to start or stop thermal video recording; the default setting is manual.
- Date and time: Set up date and time to trigger the device to start or stop thermal video recording. You can fill the date and time manually.

- Duration (Delay): Set up the delay time to start the recording after triggered.

- Conditional trigger: Set up conditional trigger. Once a condition is met, it will trigger the start or stop of recording.

- External trigger: Connect to I/O module to trigger the start or stop of recording.

Record Thermal Video Stream

-  Custom Record Frame Rate s/f User defined recording interval between frames
 -  Record Click to start recording. After clicked, it switches to:
 -  Stop Click to stop recording.
 -  Freeze Click to freeze the current thermal image. After clicked, it switches to:
 -  Unfreeze Click to unfreeze and display live stream of the thermal image.
 -  Snapshot Click to capture a thermal image and save to the pre-defined folder.
- Object Parameters Setting: Real-time updates in thermal image/video with modified parameters.

| Image Parameters | |
|------------------------------|--------------------------------------|
| Emissivity | <input type="text" value="1.00"/> |
| Reflected Temperature | <input type="text" value="20.0"/> °C |
| Atmospheric Temperature | <input type="text" value="20.0"/> °C |
| Relative Humidity | <input type="text" value="0.50"/> |
| Distance From Target | <input type="text" value="1.0"/> m |
| External Optics Temperature | <input type="text" value="20.0"/> °C |
| External Optics Transmission | <input type="text" value="1.00"/> |

- Emissivity
- Reflected temperature
- Atmospheric/ambient temperature
- Relative humidity
- Distance to object
- External optics temperature (when IR window or external optics placed between thermal camera and object)

- External optics transmittance (when IR window or external optics placed between thermal camera and object)

3.1.4 Page Layout

Right click on the blank area of the toolbar to set up the page.

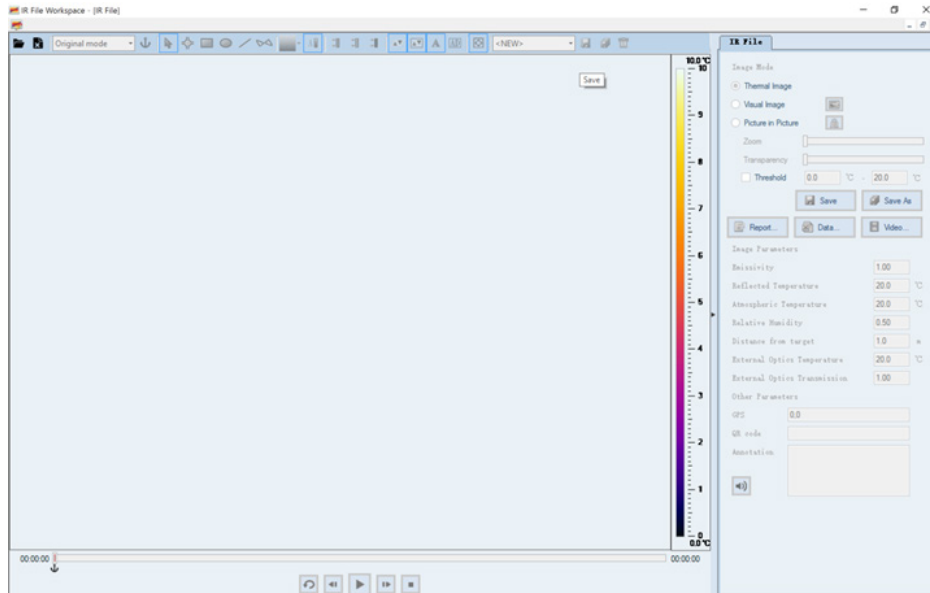





- **Reset Workspace Layout** Fill all pages within the workspace.
- **Save Workspace Layout** Save current page layout. The workspace will be opened and displayed with the saved page layout.
- **Load Workspace Layout** Load saved page layout.

Note: User can import and play .IRS file in the IR Camera Workspace window. The UI is the same as when an external thermal camera is connected.

3.2 IR File Workspace

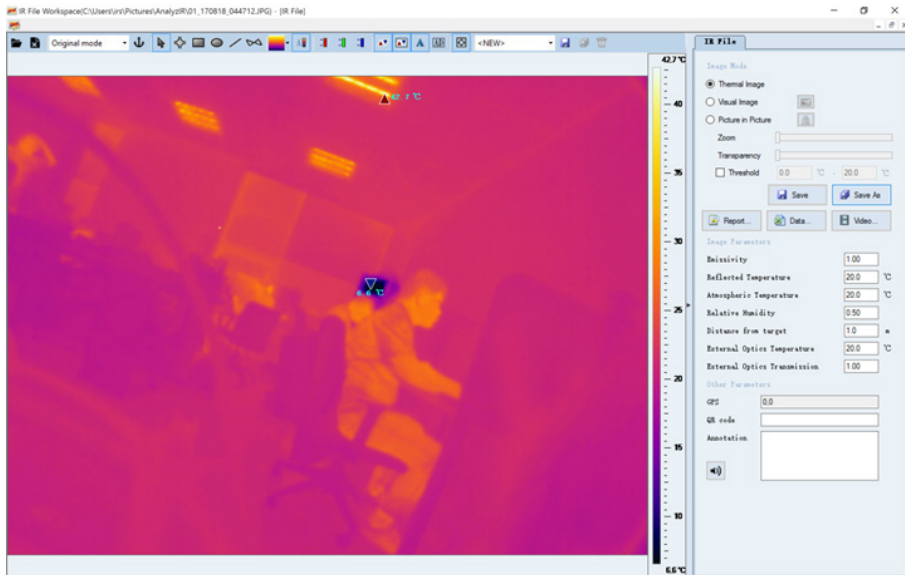
3.2.1 Main User Interface Window



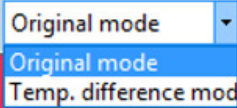


-  Restore, move, size, minimize, and maximize the workspace
-  Import .IRS file or FOTRIC thermal image
-  Close the opened .IRS file or FOTRIC thermal image

3.2.2 IR File Workspace Analysis Interface

An example of importing .IRS file

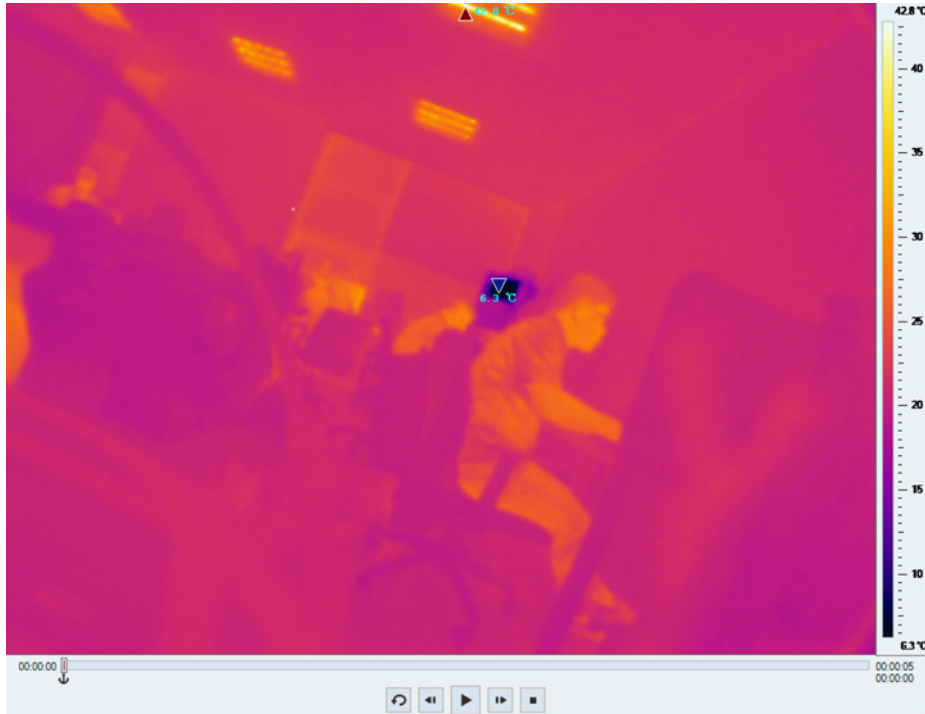


Toolbar with different analysis tools:

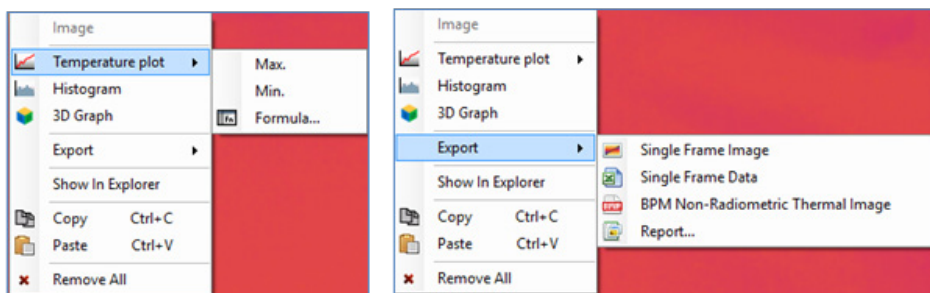
-  Analysis Type:
 - Original Mode: Default mode. Display temperature of imported thermal image.
 - Temperature difference mode: Display the temperature difference between the current frames to the defined base frame.
-  Set up the current frame as the base frame under temperature.
- 

Toolbar with different analysis tools. Same functions as IR Camera Workspace. Refer to section 2.1.2 for more information.

Thermal Video Display Window



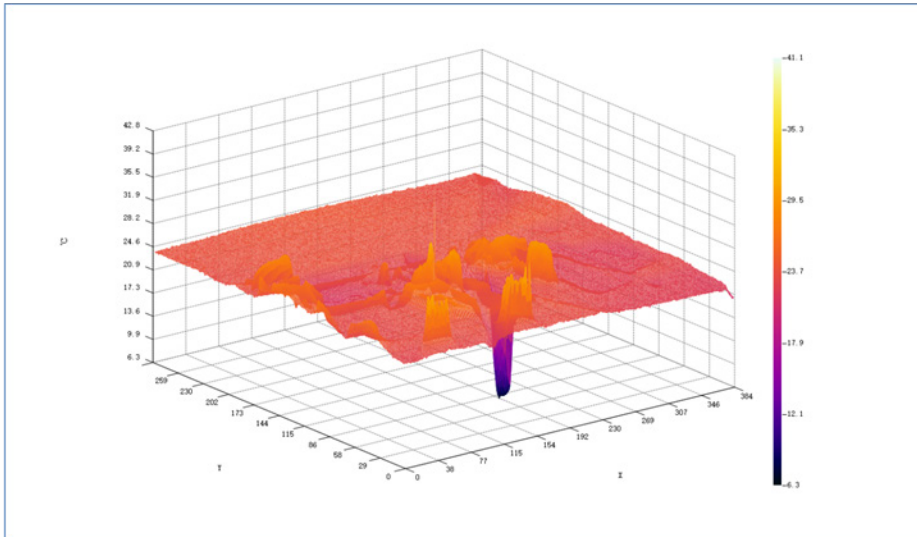
- Temperature scale (temperature bar) is on the right side of the thermal image. When double clicked, it's automatically switched to fixed temperature scale; you can change the upper and lower limit by dragging the mouse.



Right click on the thermal video image; you can access other functions.

- Temperature plot: Generate the profile of temperature vs. time. Besides the max. and min. temperatures, you can define your own temperature by creating the formula.
- Histogram: Display the histogram graph (intuitive temperature distribution).
- 3D Graph: Display the current thermal image in 3D. You can change the view

angle and azimuth angle to change the viewing angle of the 3D picture.



- Export:
 1. Single Frame Image: Export current frame as a thermal image file (with temperature data and can be analyzed later).
 2. Single Frame Data: Export temperature data of current frame as a .csv file.
 3. BPM Non-Radiometric Thermal Image: Export current frame as a .bpm file (without temperature data and cannot be analyzed later).
 4. Report: Export to report template. You can fill other information to make a complete report.
- Show in Explorer: Open the folder where current thermal video/image is from.
- Copy: Copy the position information of spot or area selections in current thermal image, which can be copied to other files.
- Paste: Paste the copied information.
- Remove all: Remove all spot and area selections.

Report Number:


1. Basic Information

| | | | |
|---------|----------------------|------------|----------------------|
| Company | <input type="text"/> | Department | <input type="text"/> |
| Contact | <input type="text"/> | Phone | <input type="text"/> |
| Address | <input type="text"/> | | |

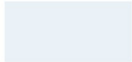
2. Inspection Information

a. Inspection Images

Infrared thermal image



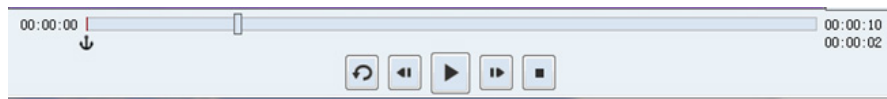
Visible light reference photo



b. Test Environment

| | | | |
|------------------|---|--------------------------|--|
| Test instruments | <input type="text" value="Fotric 612#L28"/> | Lens configurations | <input type="text"/> |
| Weather | <input type="text"/> | Ambient temperature (°C) | <input type="text" value="20.0"/> |
| Distance (m) | <input type="text" value="1.0"/> | Relative humidity (%) | <input type="text" value="0.5"/> |
| Emissivity | <input type="text" value="1.0"/> | Shooting Time | <input type="text" value="0001-01-01 00:00:00"/> |

c. Test Data



Thermal video file playback control options:

- 
 Click to switch the display of duration

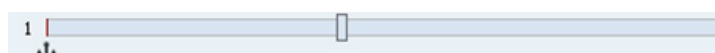
- Time difference starting with 0








- Recording time



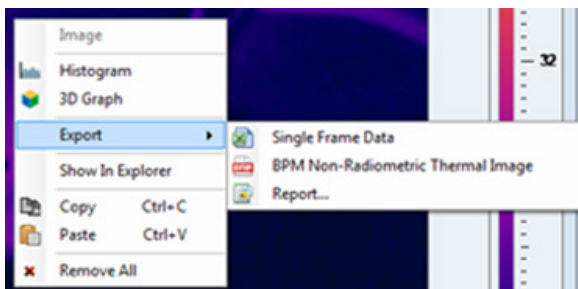
- Number of frames of recording file



-  Loop playback
-  Last frame
-  Next frame
-  Play and pause
-  Stop and revert back to the beginning

Thermal Image Display Window

Note: Same operations as Thermal Video Display Window above. Right click on the thermal image and you can access other functions.





3.2.3 Thermal Image Parameter Setting Panel

IR File

Image Mode

Thermal Image

Visual Image 

Picture in Picture 

Zoom

Transparency

Threshold °C - °C

Image Parameters

Emissivity

Reflected Temperature °C

Atmospheric Temperature °C

Relative Humidity

Distance from target m

External Optics Temperature °C


External Optics Transmission

Other Parameters

GPS

QR code

Annotation



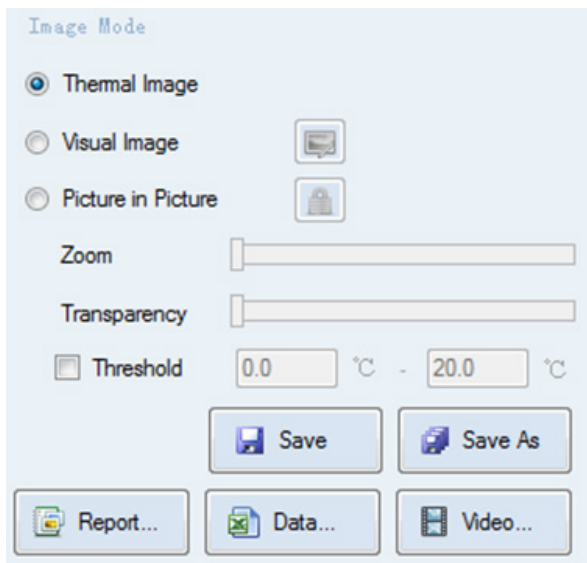



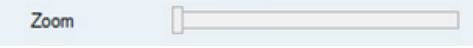
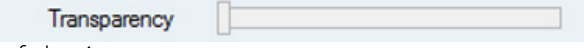


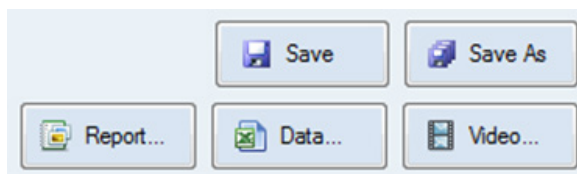
Image Mode:

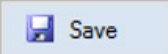

- Thermal Image: Display thermal image in the workspace window.
- Visual Image  Visual Image: Display visual image in the workspace window.
- Picture in Picture  Picture-in-picture: Display the thermal image inside the visual image.
 1. Click the  Lock flag to change the size of the thermal image by dragging the thermal image.

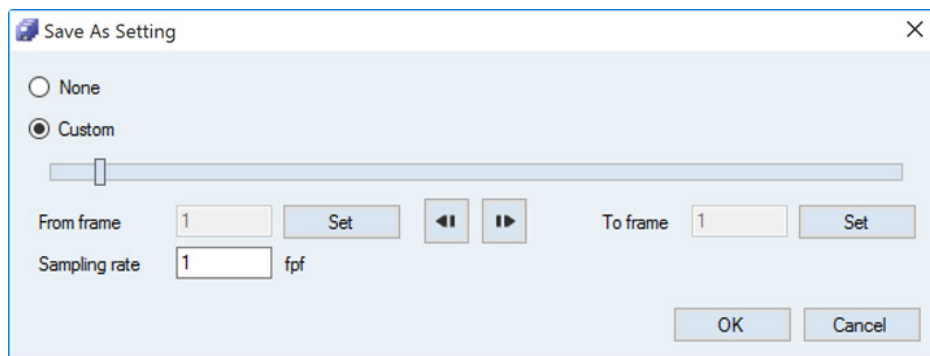


2.  Zoom the image in and out.
3.  Change the transparency of the image.
4. **Threshold** °C - °C Check to display the thermal image areas with the temperature between the defined thresholds mixed with the visible image.

- Save, Save As, Report, Data Export, Video Export




-  Save Save current thermal image with all operations to the original file.
-  Save As Save current thermal image with all operations as a new file. A window pops out to configure the settings of Save As.

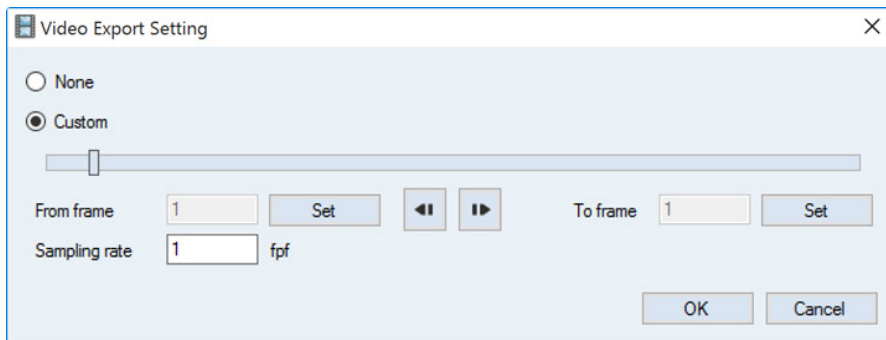


You can drag the progress bar shown; click "settings" to set the start and end frames. If the progress bar keeps rolling, please close the settings screen, pause the video play, and then open. Or, manually input the start and end frames.

Sampling frequency: Define the interval between frames to be recorded.

-  Report... Export current image into a report template.

 **Video...** Export current file as a video file. A window pops out to configure the settings.



You can drag the progress bar shown; click "settings" to set the start and end frames. If the progress bar keeps rolling, please close the settings screen, pause the video play, and then open. Or, manually input the start and end frames.

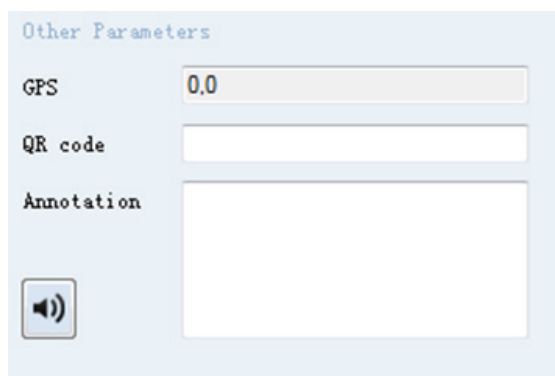
Object Parameters Setting. Real-time updates in thermal image/video with modified parameters.

| Image Parameters | |
|------------------------------|---------|
| Emissivity | 1.00 |
| Reflected Temperature | 20.0 °C |
| Atmospheric Temperature | 20.0 °C |
| Relative Humidity | 0.50 |
| Distance from target | 1.0 m |
| External Optics Temperature | 20.0 °C |
| External Optics Transmission | 1.00 |

- Emissivity
- Reflected temperature
- Atmospheric/ambient temperature
- Relative humidity
- Distance to object

- External optics temperature (when IR window or external optics is placed between thermal camera and object)
- External optics transmittance (when IR window or external optics is placed between thermal camera and object)

Other Object Parameters Setting



Other Parameters

GPS 0.0

QR code

Annotation

Speaker icon

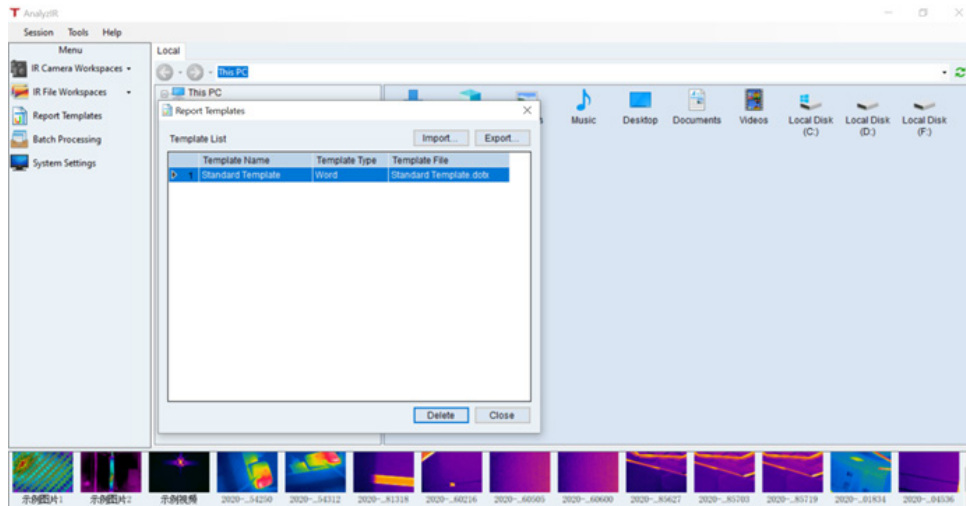
- GPS: Automatically imported data, related to the device.
- QR code: Equipment QR code.
- Annotation: Add descriptions of equipment or test.

3.2.4 Page Layout

Refer to section 2.1.4.

3.3 Report Template

First, select report template button, left click to open its sub-menu



This sub-menu includes functions:

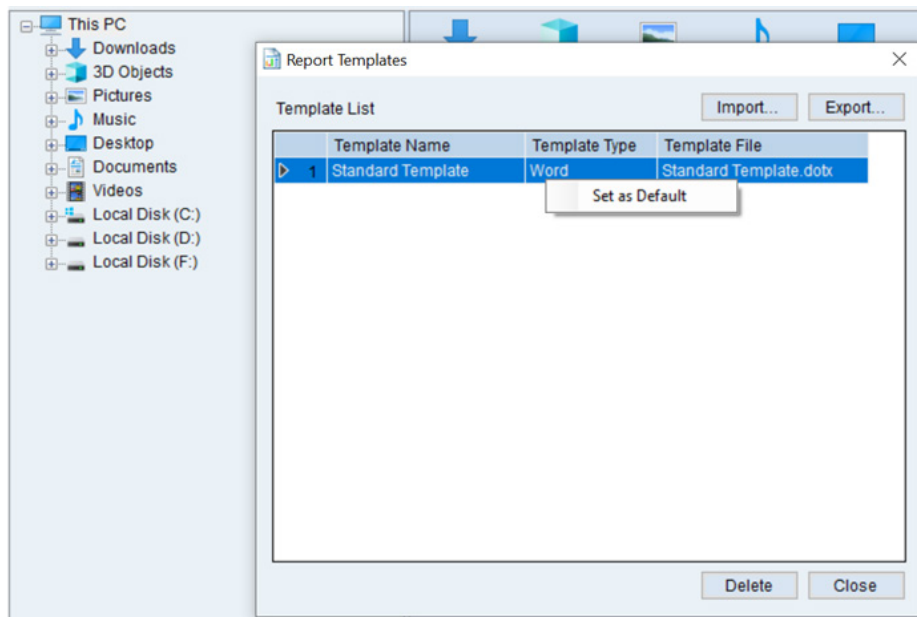
- Set default template
- Import template
- Export template
- delete template

Edit template is done in the external office word file.

3.3.1 Set default template or cancel default

In the template list, right click on the selected template to set as default, or cancel it.

After set as default, all reports(include batch processing) will use this template.



3.3.2 Customize a report template

Below are the operation procedures:

1. Create a template in Office Word format, or export the "standard template" and open it in office word software:

! Note: Suggest to use tables to display the temperature parameters or measurement results.

! Note: Suggest to input some letters or pictures in the variable or measurement content areas of template, to ensure all the letters fonts and size will be same in the report, as show below. Those added contents will be replaced when generating reports.

******Report**

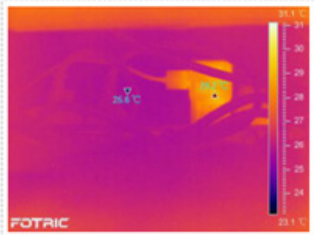

Report Number:

1. Basic Information

| | | | |
|---------|--|------------|--|
| Company | | Department | |
| Contact | | Phone | |
| Address | | | |

2. Inspection Information

1. Inspection Images

| | |
|---|---|
| Infrared thermal image | Visible light reference photo |
|  |  |
| [image name] | |

b. Test Environment

| | | | |
|-------------------|----------------|---------------------|-----------------|
| Test instruments | [camera model] | Lens configurations | |
| Weather | | Ambient temperature | [at] |
| Distance | [distance] | Relative humidity | [rh] |
| <u>Emissivity</u> | [emissivity] | Shooting Time | [shooting time] |

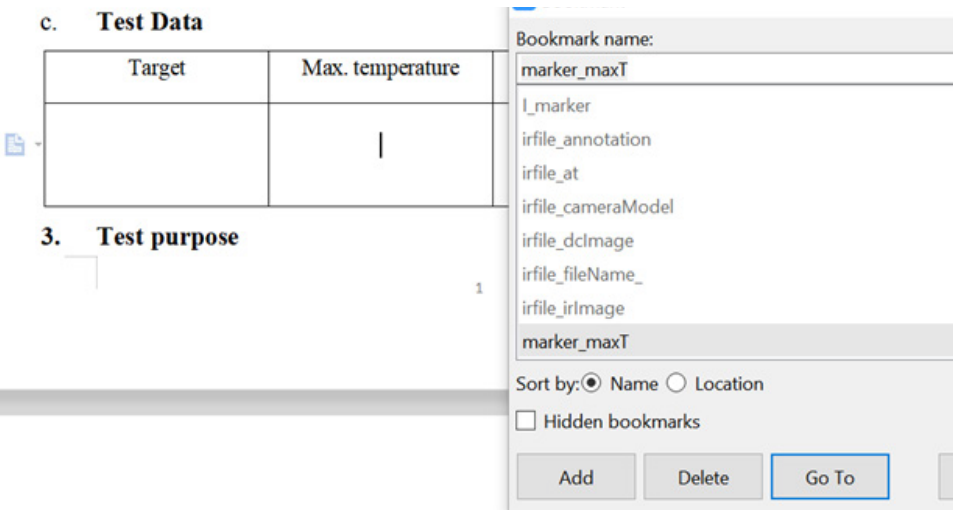
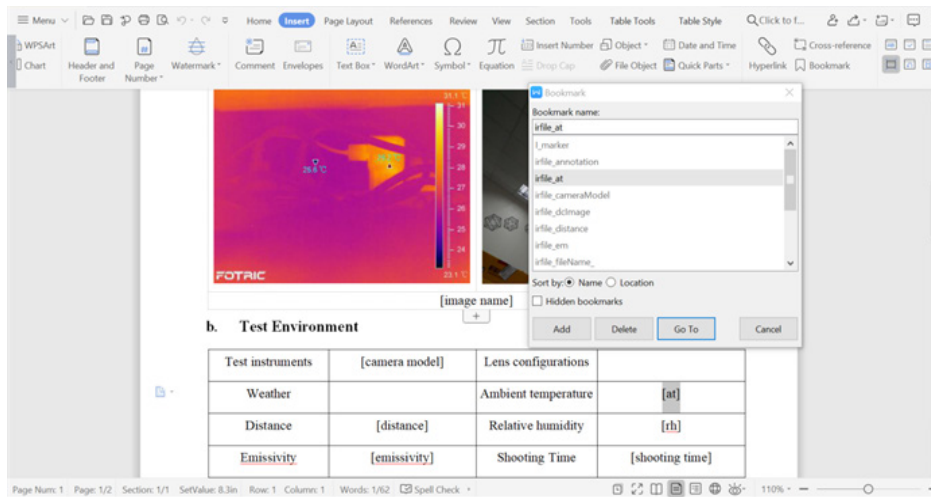
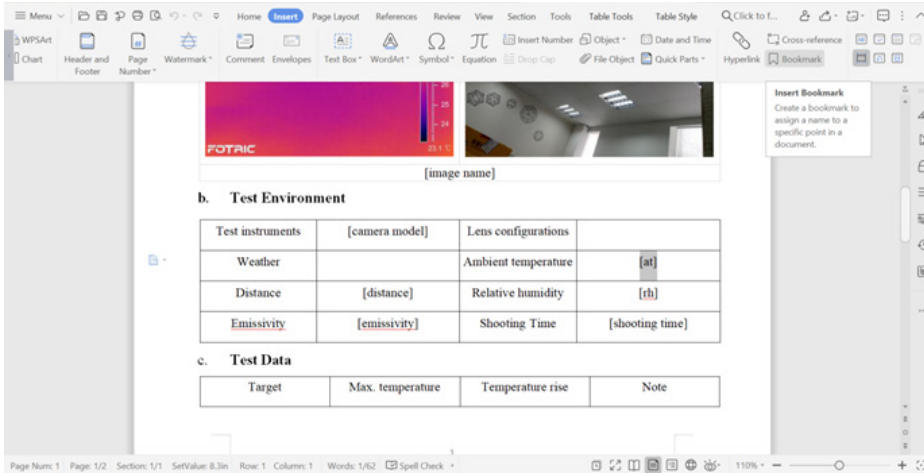
c. Test Data

| | | | |
|--------|------------------|------------------|------|
| Target | Max. temperature | Temperature rise | Note |
|--------|------------------|------------------|------|

2. Add bookmarks in the table's result cells.

During generating report phase, the AnalyzIR software will automatically search all the bookmarks in the template file, and link all variable or measured results to the bookmarks areas, such as measurement device, parameters and temperature results.

! Note: After added the letters and pictures , please choose them when add bookmarks, otherwise those contents might be kept. As show below:



3. The bookmarks setting has its rules.

Please add bookmarks in the table cells. For example, if need to add emissivity parameter in the report, they add bookmark irfile_em.

"irfile" is for the parameters/environment settings table.

"marker" is for the measurement result table.

More bookmarks setting rules are are listed as below.

| Type | Bookmarks name | Full name if needed |
|--------|------------------|----------------------------|
| irFile | "index" | — |
| | "filename" | — |
| | "annotation" | — |
| | "em" | emissivity |
| | "at" | Ambient temperature |
| | "rt" | Reflection temperature |
| | "rh" | humidity |
| | "distance" | |
| | "eot" | External optic temperature |
| | "eoe" | External optic emissivity |
| | "latitude" | — |
| | "longitude" | — |
| | "cameramodel" | — |
| | "cameraseriesno" | — |
| | "qrcode" | QR code |
| | "shottime" | Capture time |
| | "irimage" | Thermal image |
| | "dcimage" | Visual light image |
| | "pipimage" | Picture in picture image |
| | "hisimage" | Histogram image |
| | "lpimage" | Line-temp image |
| | "tlimage" | Time-line image |
| | "3dimage" | 3D graph image |
| | "marker" | ROI measurement tool |
| | "index" | — |
| | "name" | — |
| | "independem" | Independent emissivity |
| | "maxt" | Max temperature |
| | "mint" | Min temperature |
| | "avgt" | Average temperature |
| marker | "index" | — |
| | "name" | — |
| | "independem" | Independent emissivity |
| | "maxt" | Max temperature |
| | "mint" | Min temperature |
| | "avgt" | Average temperature |

4. In the marker(ROI measurement tool)'s table, because there can be many markers, so the Loop coding statement is needed.

The loop statements are as below:

| Bookmarks loop statement | | | |
|---|-----------|------------|---------------------------|
| Bookmarks statement Include Loop, search, calculate and so on | | | |
| Type | Statement | Meanings | For example |
| Loop | o | Outer loop | o_task |
| | i | Inner loop | i_irfile |
| Search | s | gt > | More than.. |
| | | get >= | More or equal to.. |
| | | lt < | less |
| | | let <= | Less or equal to.. |
| | | et = | Equal to.. |
| Calculation units | add | Add | marker_maxT_add_irfile_at |
| | sub | minus | --- |
| | mul | multiply | --- |
| | div | Divided | --- |

- O loop is outer loop, means if loop for one time, there will be one more whole table. It is normally used in measurement tools table, to generate the all results in different tables.
- I loop is the inner loop, means if loop for one time, there will be one more rows. It is normally used in measurement tools table, to generate the all results in one table.
- Searching statement is used for screening. For example temperature value upon 30 degree, types_ marker_gt_30. so the report will not show the numbers lower than 30 degree.
- Calculation is used to make some formulas. for example the temperature rise: marker_maxT_sub_irfile_at, means max temperature(marker_maxT) minus (plus) ambient temperature(irfile_at).

5. In summary, the measurement parameters and result tables need to add coded bookmarks inside the content.

When use "I_marker"(in loop), please first choose the whole row, like below

b. Test Environment

| | | | |
|------------------|----------------|---------------------|--|
| Test instruments | [camera model] | Lens configurations | |
| Weather | | Ambient temperature | |

c. Test Data

| | | | |
|--------|------------------|------------------|--|
| Target | Max. temperature | Temperature rise | |
| | | | |

3. Test purpose

1

Secondly, choose the fist cell, click "bookmarks", input marker_name:

c. Test Data

| | |
|--------|------------------|
| Target | Max. temperature |
| I | |

3. Test purpose

1

And then, choose other cells, click "bookmarks:, input marker_max temp, and so on..

Weather

Ambient temperature

[at]

c. Test Data

| | |
|--------|------------------|
| Target | Max. temperature |
| | I |

3. Test purpose

1

c. Test Data

| Target | Max. temperature | Temperature rise | Note |
|--------|------------------|------------------|------|
| | | | |

3. Test pt

Bookmark
 Bookmark name:
 marker_maxT_sub_irfile_at
 irfile_annotation
 irfile_at
 irfile_cameraModel
 irfile_dclmage
 irfile_fileName_
 irfile_irlmage

6. After complete set all the bookmarks in the report template, save the word file.

! Note: The bookmarks input must only contains: letters/numbers/slash.. and the letters must be connected with “_”.

3.3.3 Import, Export or delete report templates

The screenshot displays the AnalyzIR software interface. On the left, a menu lists options: IR Camera Workspaces, IR File Workspaces, Report Templates, Batch Processing, and System Settings. The main window shows a 'Report Templates' dialog box with a 'Template List' table:

| Template Name | Template Type | Template File |
|-------------------|---------------|------------------------|
| Standard Template | Word | Standard Template.docx |

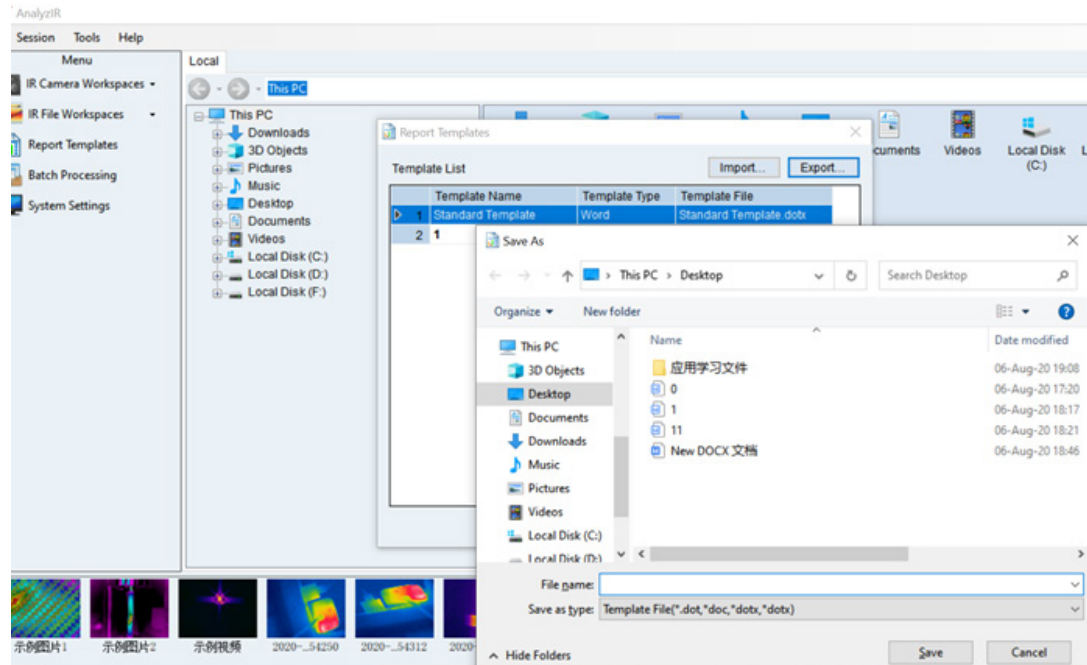
Below the dialog box, a file explorer window is open to the Desktop, showing a list of files and folders:

| Name | Date modified |
|-------------|-----------------|
| 应用学习文件 | 06-Aug-20 19:08 |
| 0 | 06-Aug-20 17:20 |
| 1 | 06-Aug-20 18:17 |
| 11 | 06-Aug-20 18:21 |
| New DOCX 文档 | 06-Aug-20 18:46 |

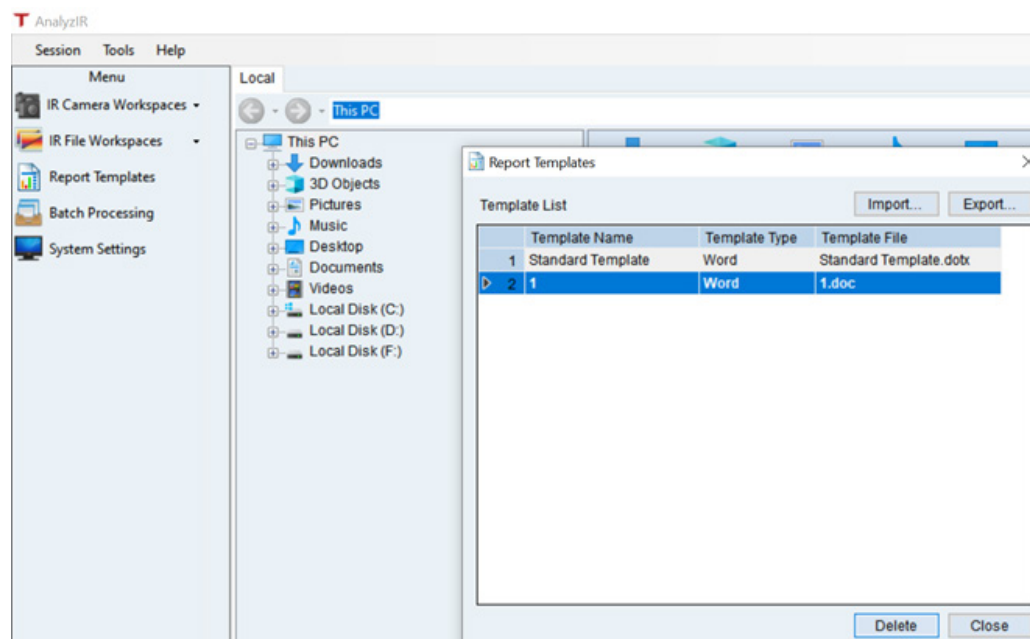
The file explorer window also shows the 'File name' field containing '1' and the 'Template File' dropdown set to 'Template File(*.dot,*doc,*dotx,*...)'.

Click : import.. - open folder- click open - complete template import.

If it prompt failed to import, there might be some errors or header/footer errors.

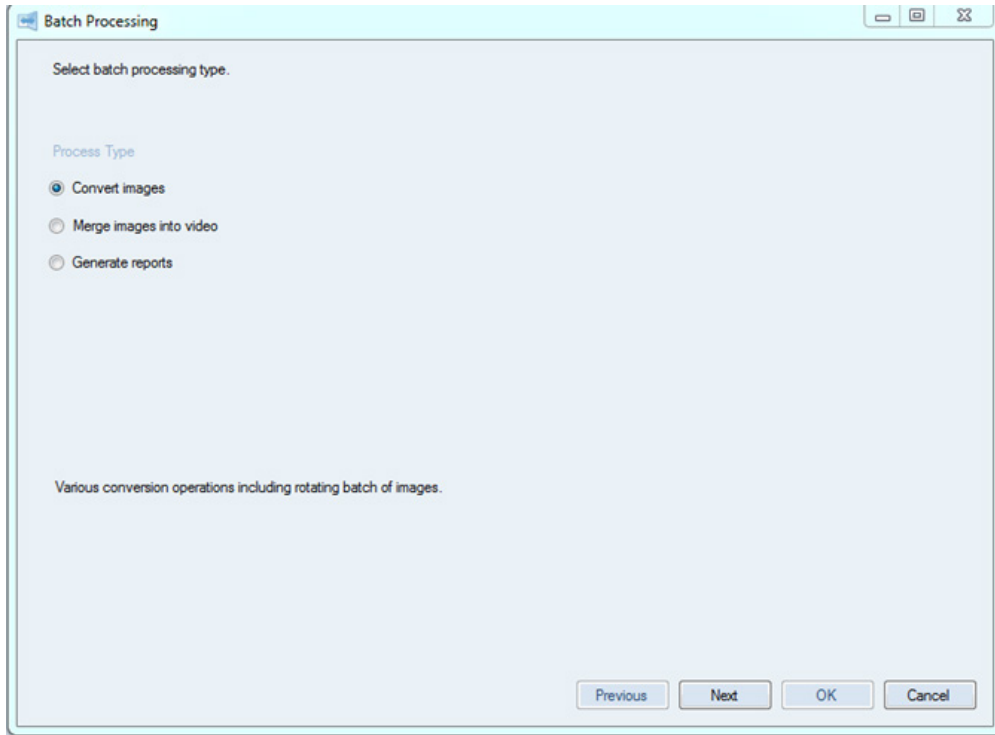


Click: export.. - open folder- type a file name- click save - complete template export.

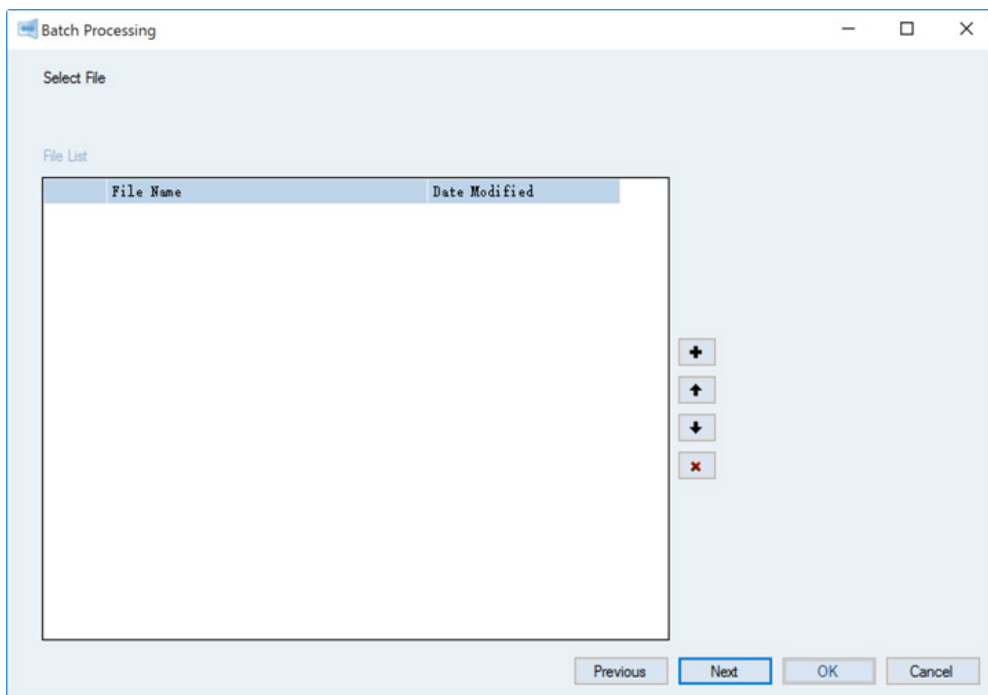






Choose the useless template, click delete button to delete.

3.4 Batch Processing

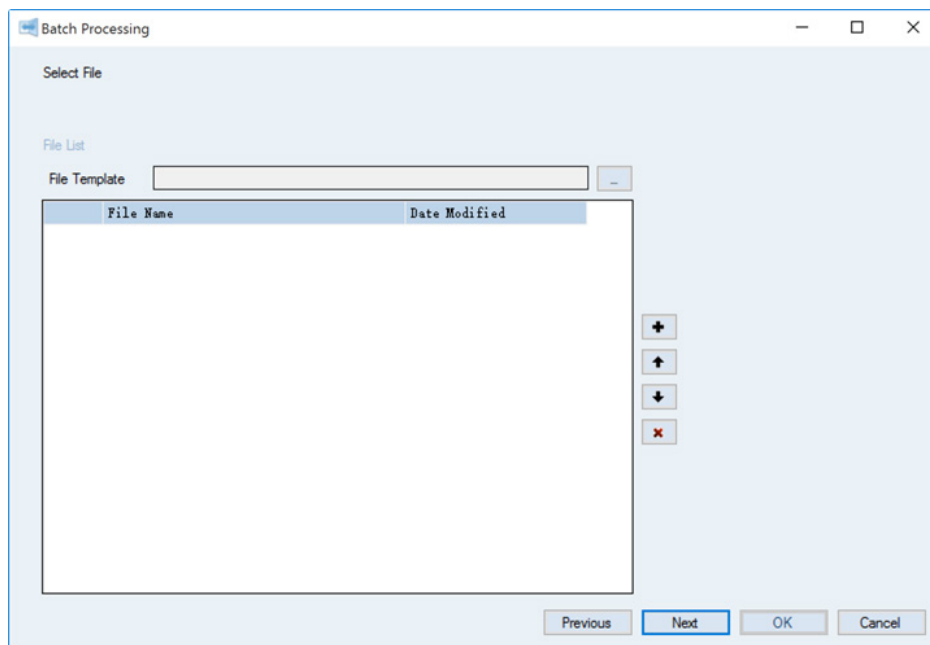





3.4.1 Convert Images



-  Add thermal image files (cannot add visible image).
-  Move up the image file location.
-  Move down the image file location.
-  Delete the selected thermal image file.

3.4.2 Merge Images Into Video

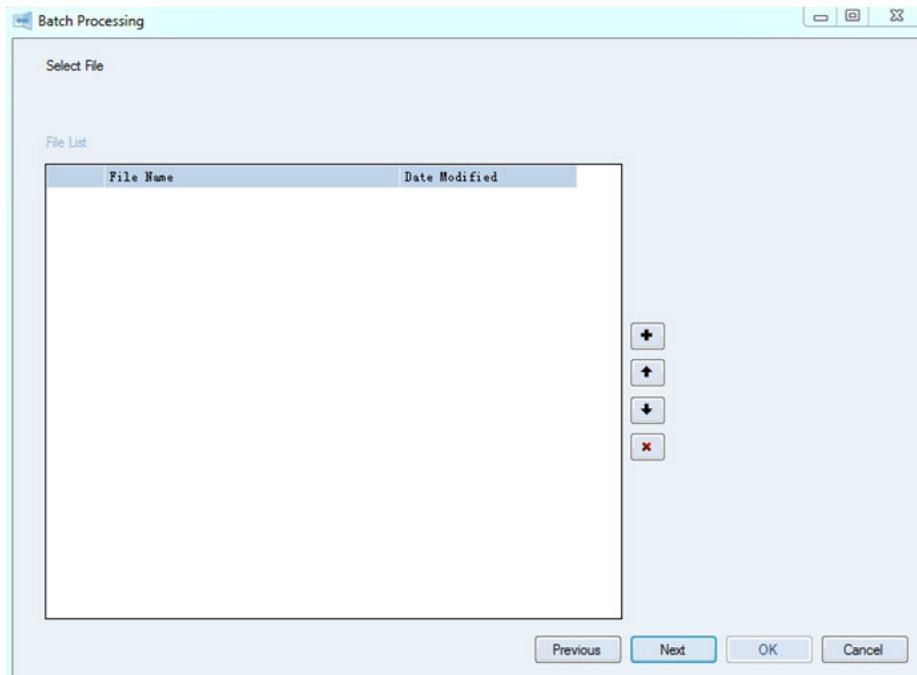






- File template: Select the start image/video file (thermal image file or .IRS file). Added files must be taken from the same thermal camera as the file template.
-  Add thermal image/video files (cannot add visible image). Added files must be taken from the same thermal camera as the file template.
-  Move up the image file location.
-  Move down the image file location.

-  Delete the selected thermal image file.

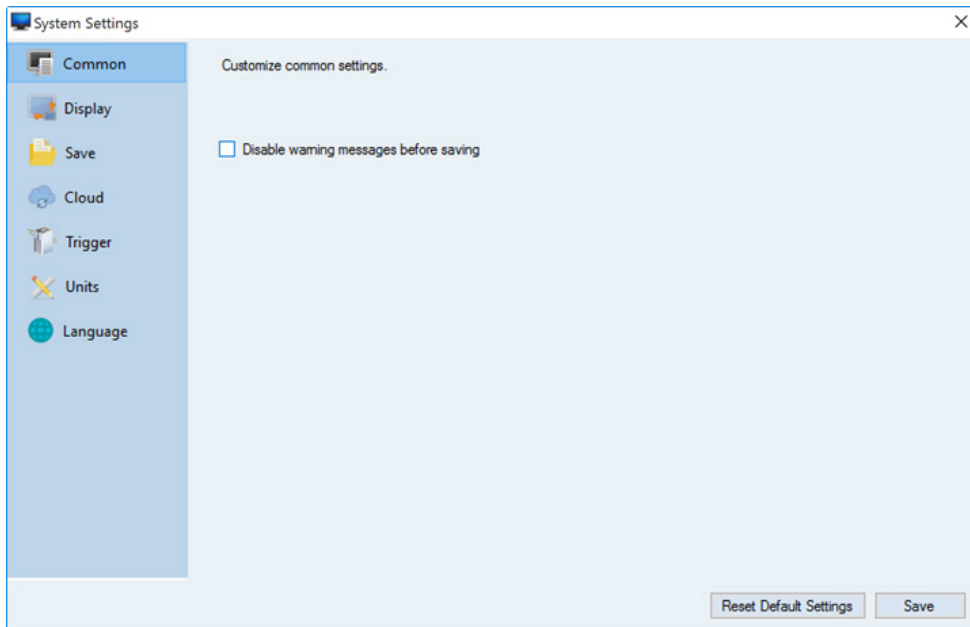
3.4.3 Generate Reports

Create reports in batch.



-  Add thermal image files (cannot add visible image).
-  Move up the image file location.
-  Move down the image file location.
-  Delete the selected thermal image file.

3.5 System Settings



3.5.1 Common

- **Disable warning messages before saving** After checked, no warning messages pop up before saving.

3.5.2 Display

Customize display settings.

- Display max. temp. spot of entire image
- Display min. temp. spot of entire image
- Display max. temp. spot of measurement tools
- Display min. temp. spot of measurement tools
- Display max. temp. value of measurement tools
- Display min. temp. value of measurement tools
- Display average temp. value of measurement tools
- Display temp. difference of measurement tools
- Display max. and min. temp. value of flying spots
- Automatically adjust label position

Options to set up the data display in workspaces.

3.5.3 Save

Customize how files are saved.

File location

Save thermal and visual images in separate files

Display color palette

Inside image Outside image

Custom image size

Width Height

Set up the default folder to save files:

- Save thermal and visual images in separate files After checked, it will save thermal and visual images from the picture-in-picture window separately with different file names.

- Display color palette
- Inside image Outside image Locations of temperature color bar display.

- Custom image size
Width Height User defined image size (pixels).

Note: Width and Height must be even numbers.

Thermal cloud settings.

Local path

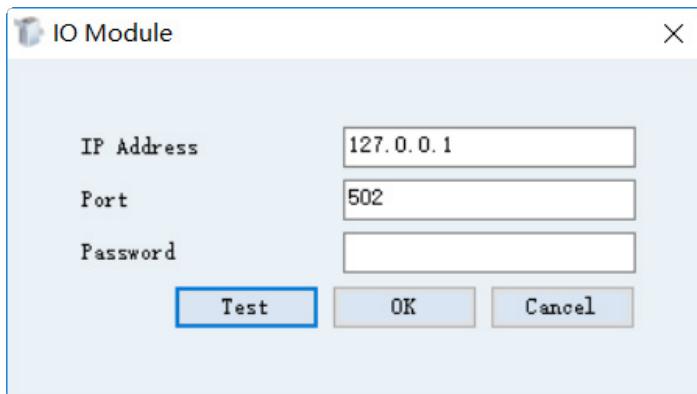
3.5.4 Trigger

Customize external trigger settings.

Trigger Type

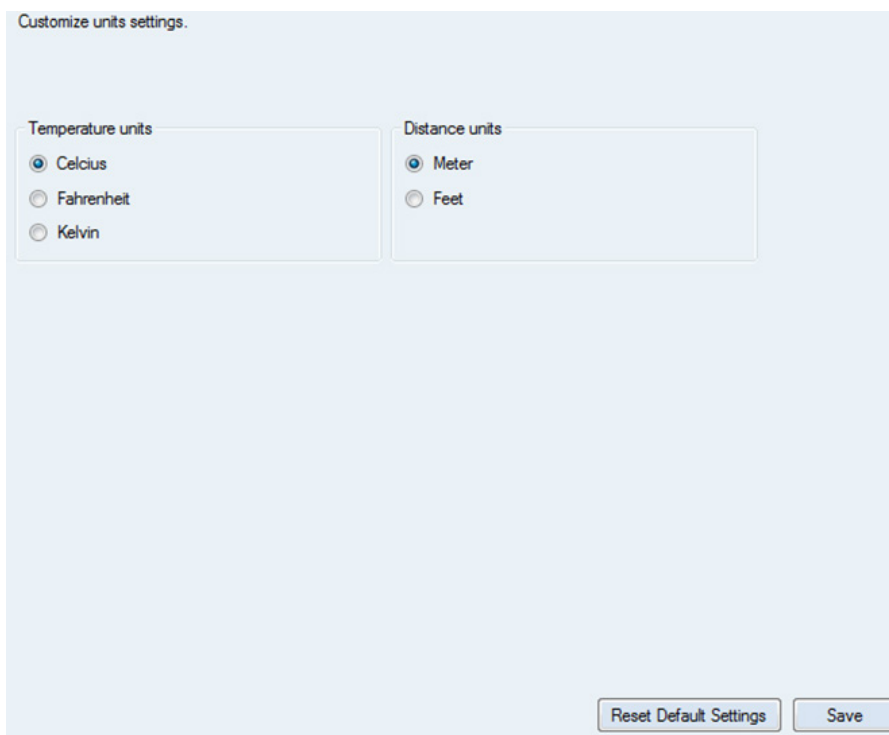
IO

Modbus



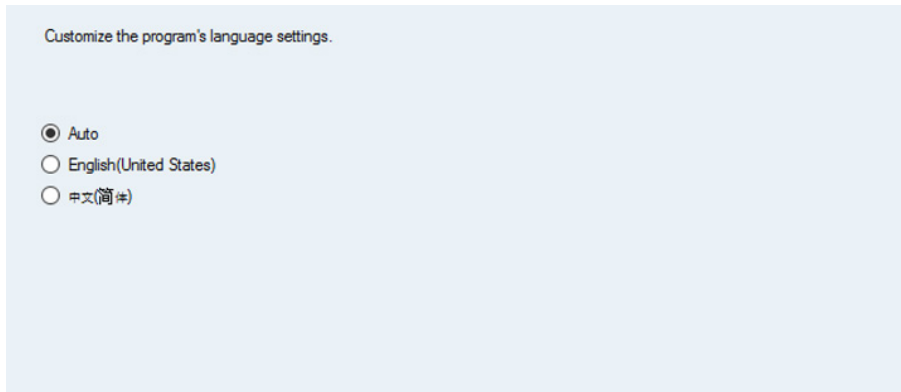
Connect to external modules. Control the start and stop of thermal video recording in IR Camera Workspace.

3.5.5 Units



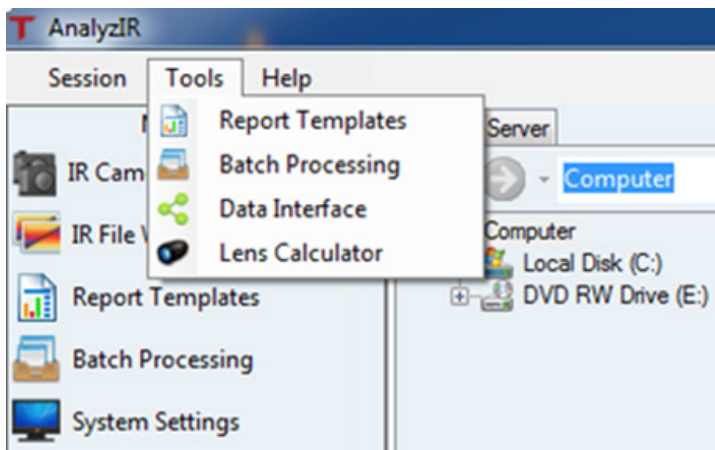
Set up temperature and distance units of workspaces. The default is "Celsius" for temperature and "Meter" for Distance.

3.5.6 Languages



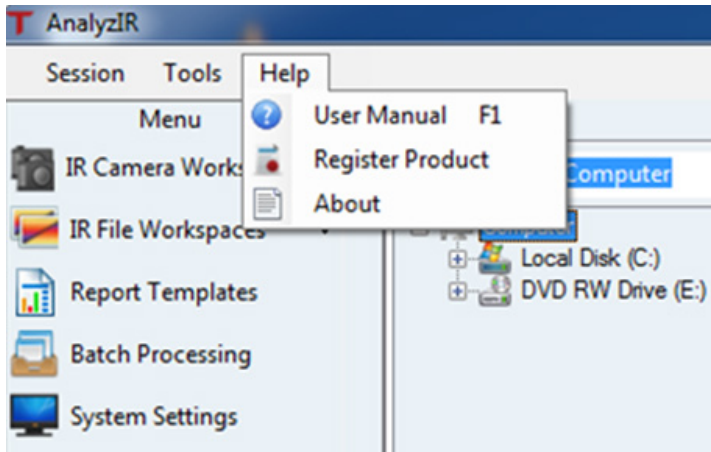
Configure the display language of the user interface (UI). The default is "Auto," which is the same as the display language of the operation system (OS).

3.6 Tools



Note: Manually input the "Marker Name" in the "Data Interface," and the addresses cannot be the same.

3.7 Help



- User Manual F1: Open user manual file.
- Register product: Register product with FOTRIC.
- About: Check the version of the software.

Note: When registering the product, the user needs Administrator authority of the computer, otherwise registration may fail.

AnalyzIR Software Download

PC analysis software AnalyzIR is a standard configuration of the product. Please visit the following website to download newest version:

<http://www.fotric.com/support/AnalyzIR>

Appendix A

Emissivity Table

(For reference only)

| Material Name | Surface Condition | Temperature(°C) | Emissivity(ϵ) |
|-----------------|------------------------|-----------------|--------------------------|
| Aluminum | Non-oxidized | 100 | 0.20 |
| | Oxidized | 100 | 0.55 |
| Brass | Polished brown | 20 | 0.40 |
| | Unpolished | 38 | 0.22 |
| | Oxidized | 100 | 0.61 |
| Copper | Severely oxidized | 20 | 0.78 |
| Iron | Oxidized | 100 | 0.74 |
| | Rusty | 25 | 0.65 |
| Cast iron | Oxidized | 200 | 0.64 |
| | Non-oxidized | 100 | 0.21 |
| Wrought iron | Roughened | 25 | 0.94 |
| | Polished | 38 | 0.28 |
| Nickel | Oxidized | 200 | 0.37 |
| Stainless steel | Oxidized | 60 | 0.85 |
| Steel | Oxidized at 800 °C | 200 | 0.79 |
| Common brick | Surface | 20 | 0.93 |
| Concrete | Surface | 20 | 0.92 |
| Glass | Polished plate | 20 | 0.94 |
| Lacquer | White | 100 | 0.92 |
| | Natural color black | 100 | 0.97 |
| Carbon | Smoke black | 25 | 0.95 |
| | Candle soot | 20 | 0.95 |
| | Graphite rough surface | 20 | 0.98 |
| Paint | Average of 16 colors | 100 | 0.94 |
| Paper | White | 20 | 0.93 |
| Sand | Surface | 20 | 0.90 |
| Wood | Polished | 20 | 0.90 |
| Water | Distilled water | 20 | 0.96 |
| Skin | Human | 32 | 0.98 |
| Pottery | Fine | 21 | 0.90 |
| | Abrasive | 21 | 0.93 |

Innovation Excellence Integrity

Company Disclaimer

Equipment described herein may require EU, US and UNSC authorization for export purposes.

Imagery for illustration purposes only.

Specifications are subject to change without notice.

FOTRIC INC. © 2020 All Rights reserved.

FOTRIC INC.

info@fotric.com

www.fotric.com