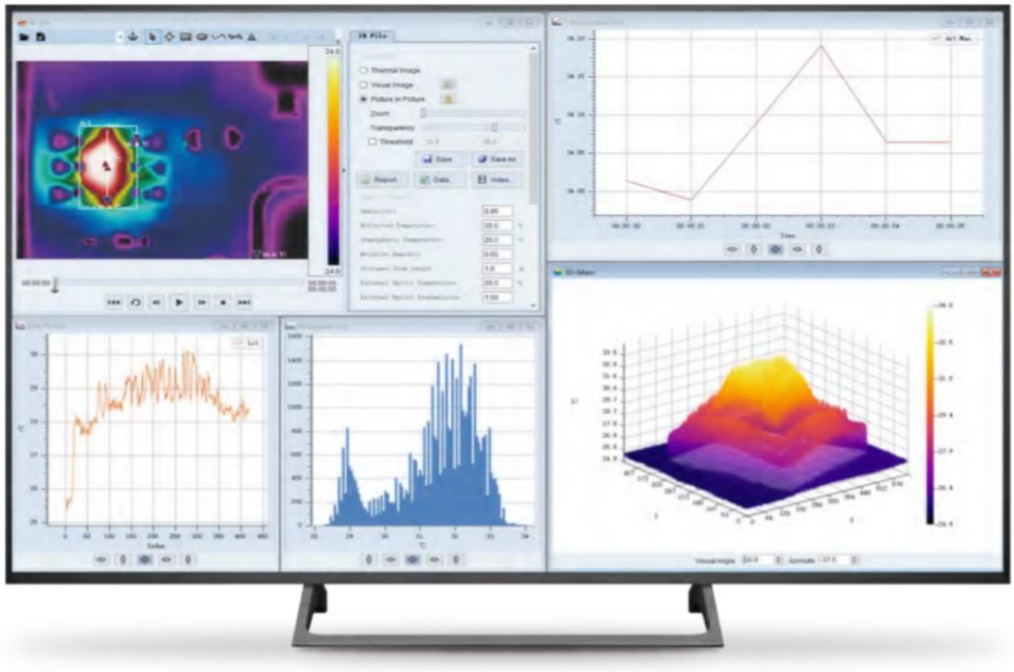
Fotric AnalyzIR PC Software

User Manual



Thank you for purchasing our products. If you have any questions or requirements, please feel free to contact us.

This user manual is intended for FOTRIC thermal image analysis PC software, AnalyzIR.

The updated content will be added to the new version of this manual without prior notice.

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1 Software Installation

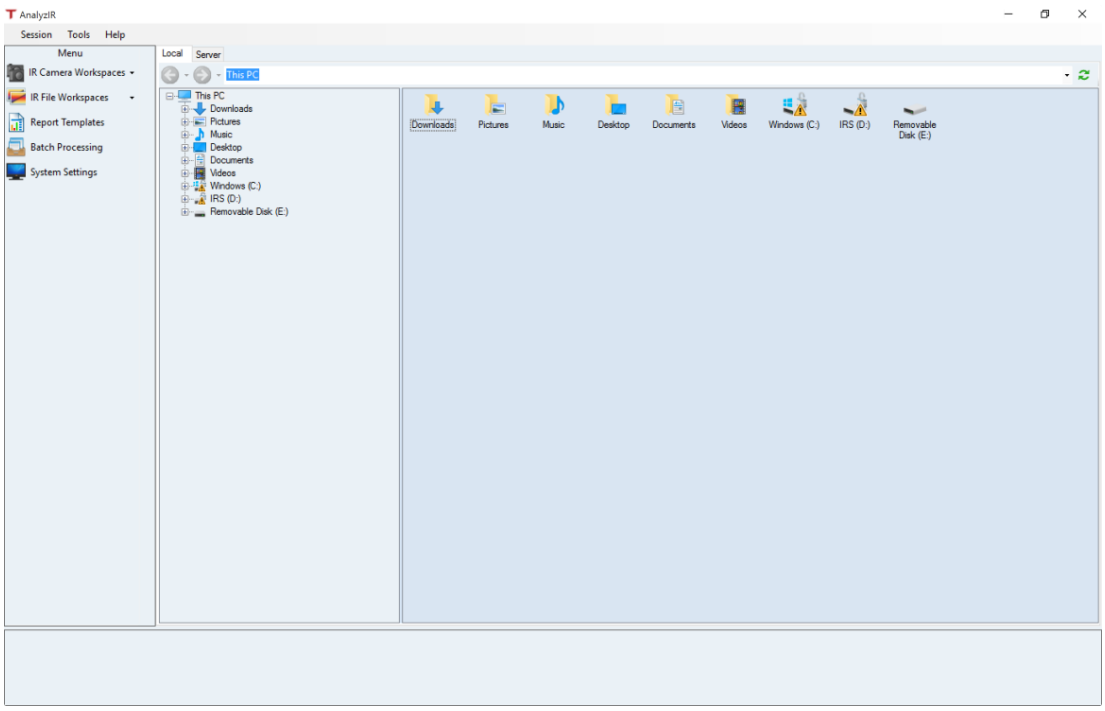
1.1 System Requirements

- 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)

1.2 Hardware Requirements

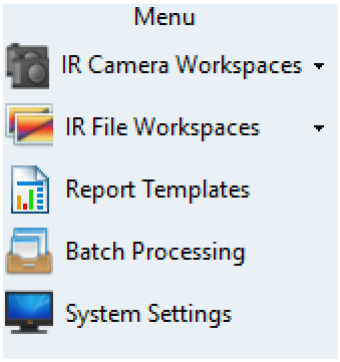
- CPU Intel Pentium IV 3.0 GHz or Higher performance
- Memory 4G or more
- Display 1024 × 768 or higher resolution

2 User Interface (UI)



- AnalyzIR Name of FOTRIC thermal image/video analysis software
- Software control key (minimize, restore, and close)
- Session Tools Help
  - Session: Menu of IR Camera Workspaces, IR File Workspaces, System Settings, and Quit
  - Tools: Report templates, batch processing, data interface and lens calculator
  - Help: User manuals, product registration and some information about the software

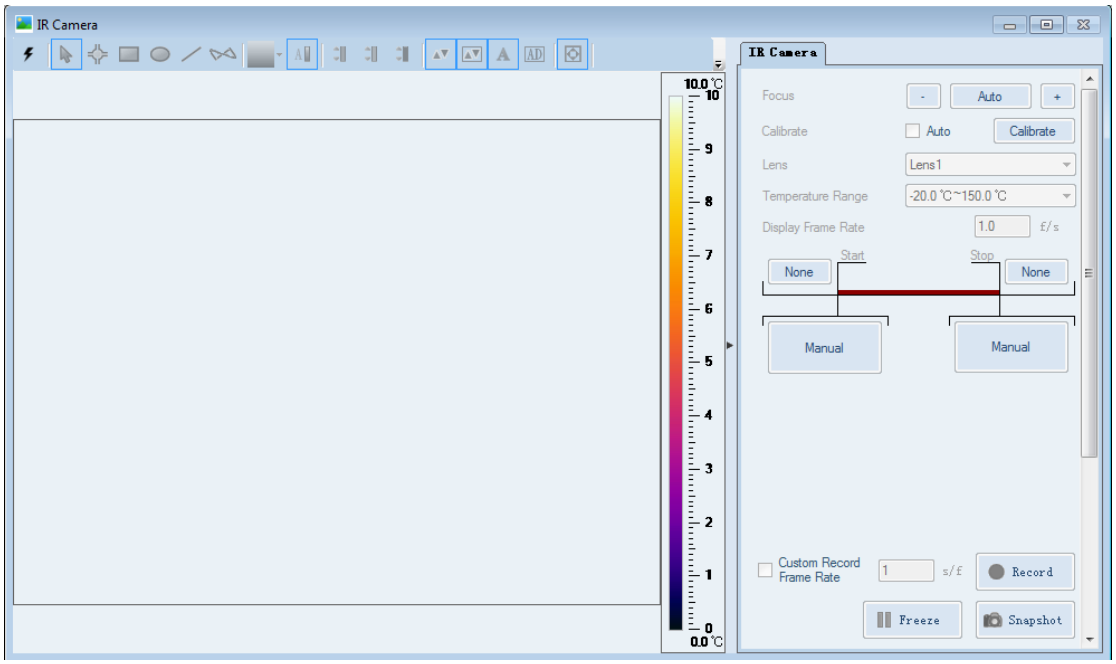
➢ Menu Contains the following menus:



- IR Camera Workspaces: Connect with an external thermal imager
- IR File Workspaces: Load .IRS file or thermal images for analysis
- Report Templates: Import, export, or edit report templates
- Batch Processing: Batch image processing, video and images mutual conversion, report generation and auto-naming
- System Settings: Set up and modify system configuration parameters

2.1 IR Camera Workspaces

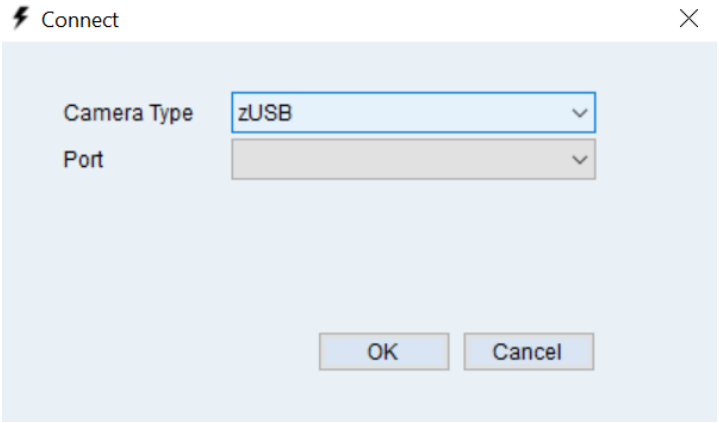
2.1.1 Main User Interface Window



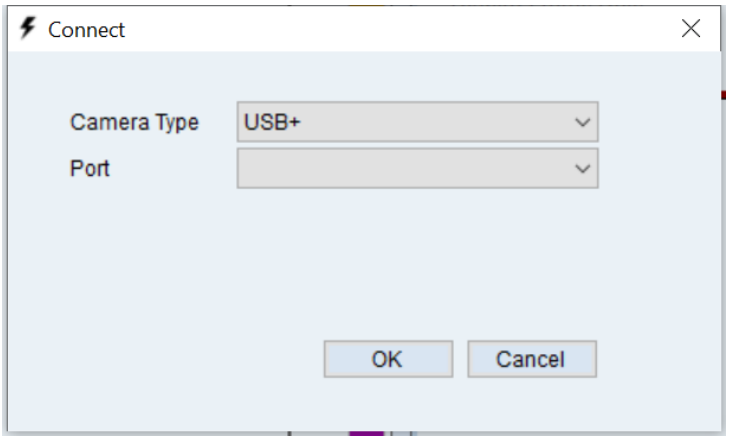
➢ Open “Connect” window

Connection type

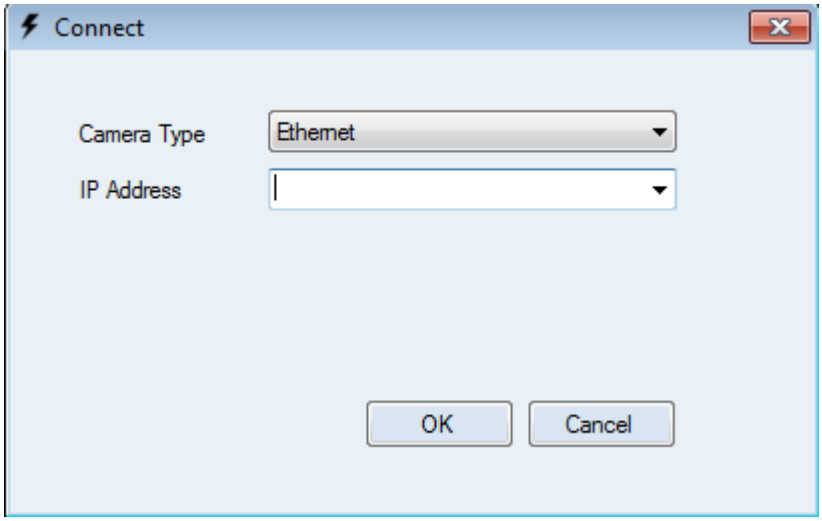
- For FOTRIC 340/320 series, Select zUSB as camera type; the “Port” number is automatically recognized. Click OK to enter the workspace.



- For FOTRIC 220 series, Select USB+ as camera type; the “Port” number is automatically recognized. Click OK to enter the workspace.

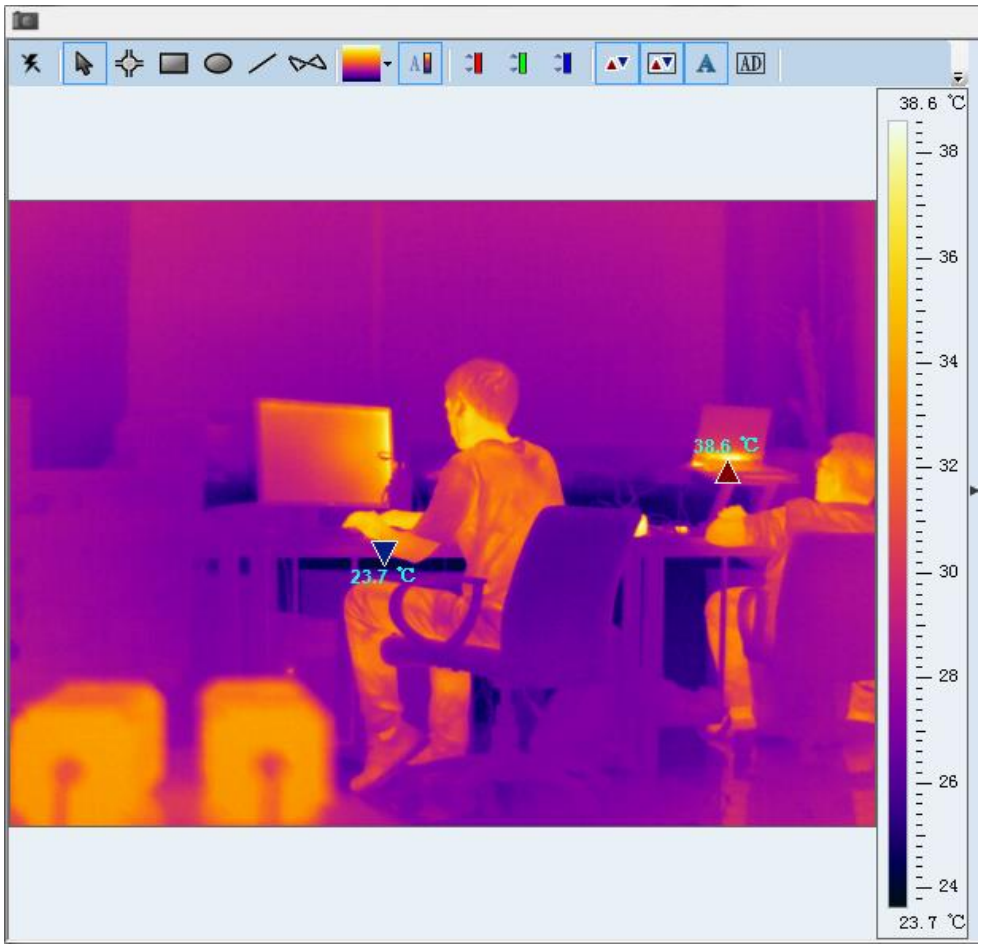


- For FOTRIC 600C series, Select Ethernet and enter the IP Address to connect with online equipment.



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

2.1.2 IR Camera image Analysis Interface



- Restore, move, size, minimize and maximize the analysis window
- Toolbar with different analysis tools

Disconnect

Arrow

Designate a spot and display the its temperature value

Designate 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). The location of max. and min. temperature of this area will be tracked automatically.

Designate 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). The location of max. and min. temperature of this area will be tracked automatically.

Set polyline and display the max., min., and average temperature values of this line (average temperature is the sum of temperature data of all points along the polyline divided by the number of points). The location of max. and min. temperature of this line will be tracked automatically. You can draw a plot of the temperature distribution along the polyline.

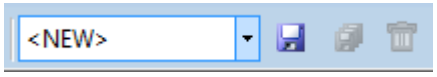
Set polygon and display the max., min., and average temperature values of this area (average temperature is the sum of temperature data of all points within the selected area divided by the number of points). The location of max. and min. temperature of this area will be tracked automatically.

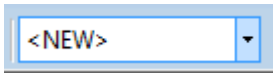
Below is an example thermal image with all the previous defined test areas.

Note: Users can select test area to obtain the temperature information.

- Choose color palette, including Grey, Iron, Rainbow, etc.
- Temperature span (temperature scale range): two options are available:
  - Auto temperature span: The upper and lower limits are the maximum and minimum temperatures of the image.
  - Fixed temperature span: Click the triangle to set the upper and lower limit of the scale.
- 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.

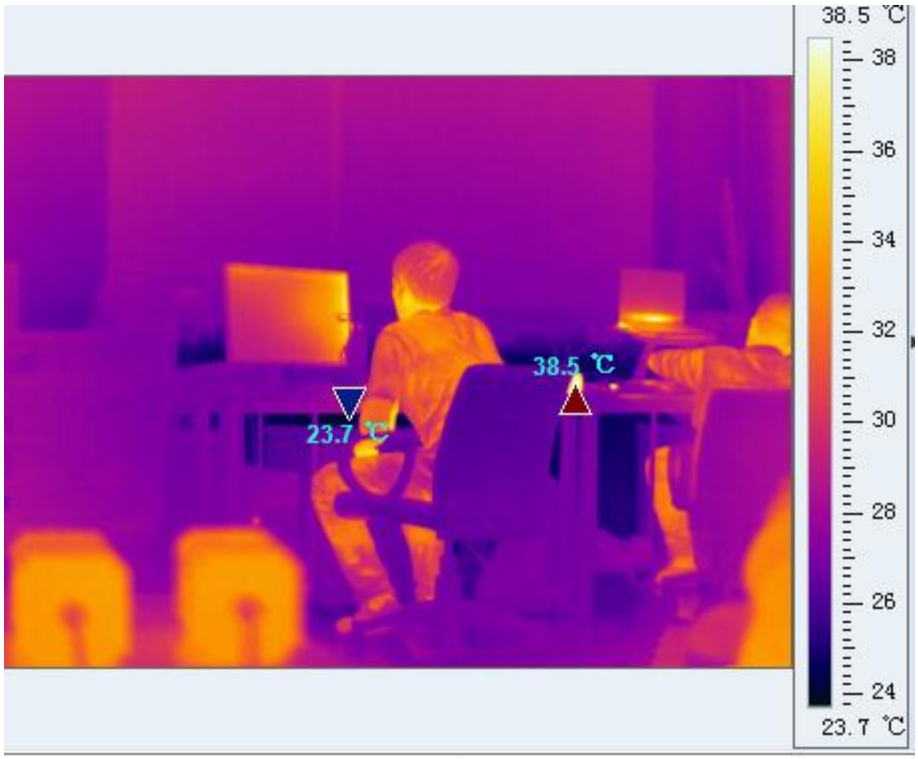
- Display max. and min. temperature of the selected measurement areas. Click the triangle mark to turn off or turn on the display.
- Display max. and min. temperature of the whole thermal image. Click the triangle mark to turn off or turn on the display.
- Turn on or turn off the display of temperature values.
- Turn on or turn off the display of AD values.
- Change fonts of the displayed values
- Click to display the hidden tool when window is smaller



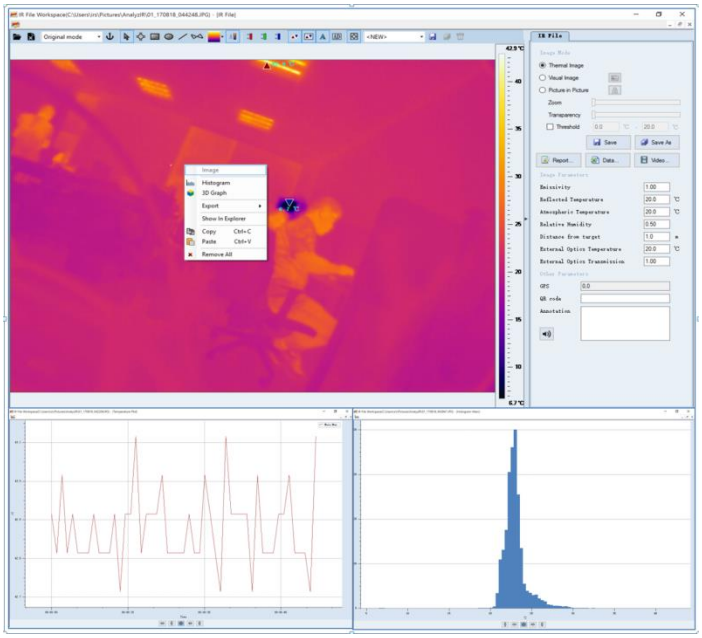
- 

Name of the saved template
- Save current screen settings as a template
- Make an extra copy of the current template
- Delete the selected template

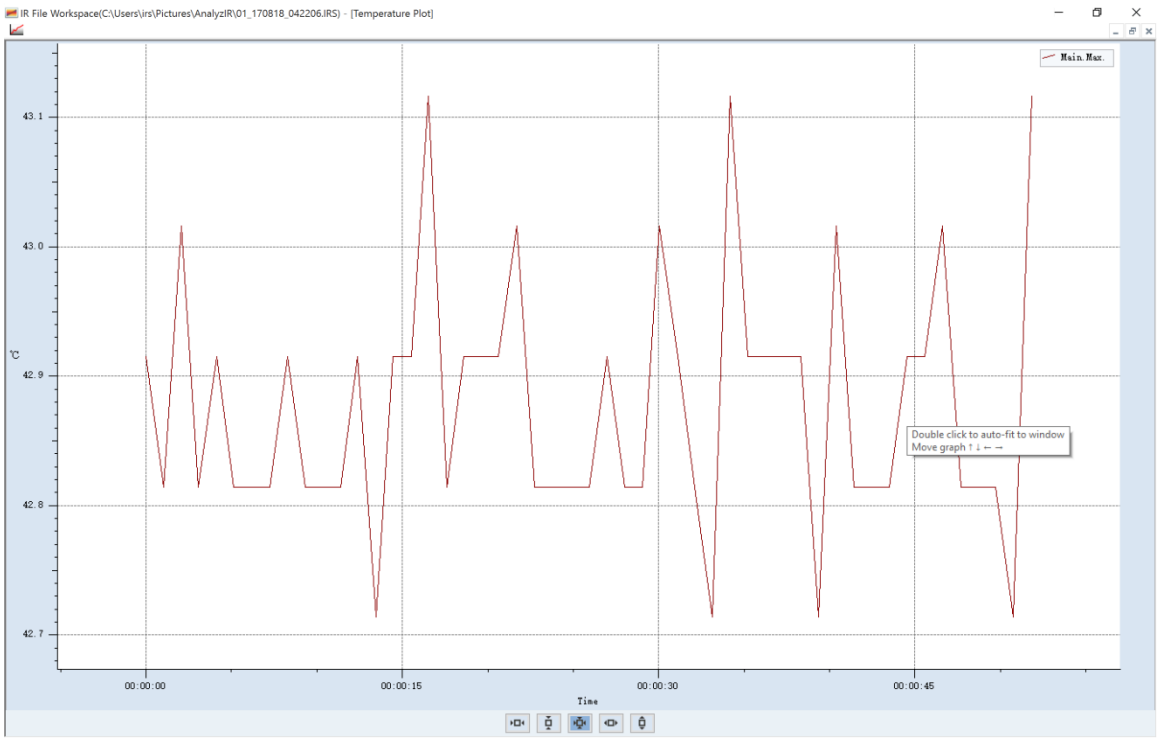
➢ Thermal Image Display Area



- 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 on the bar. To return to auto scale, click on .
- 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

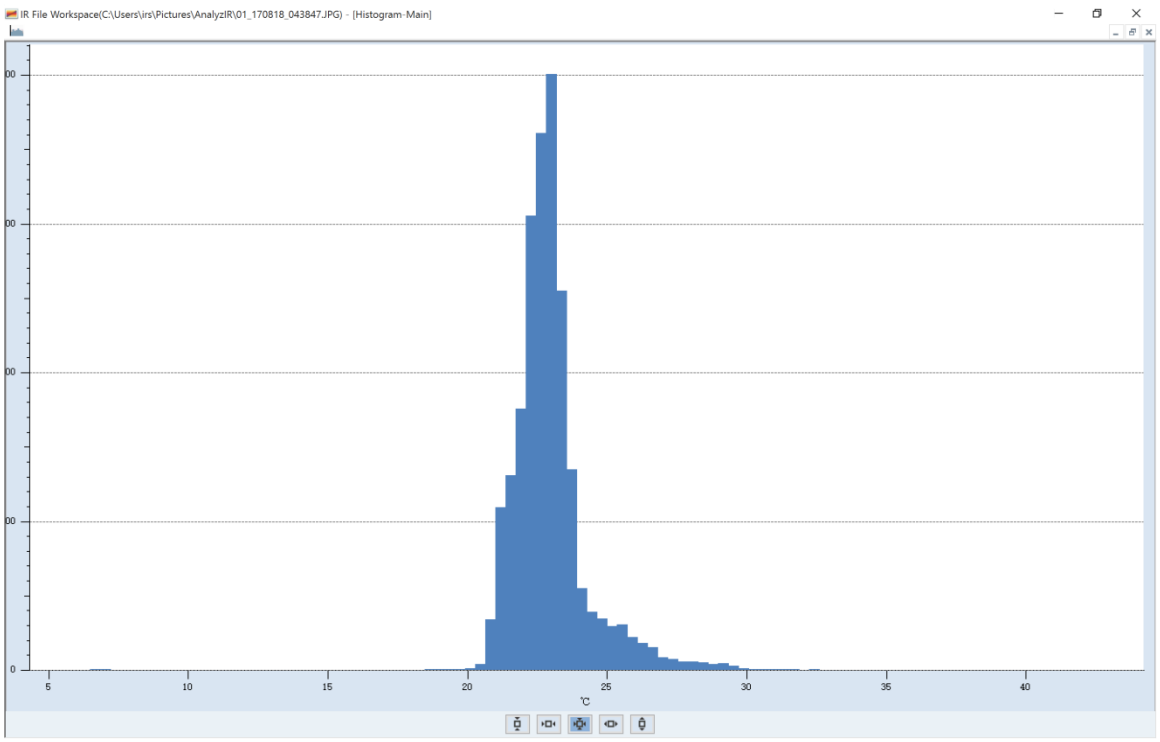
Restore to the default axis setting

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 left corner.

- Histogram

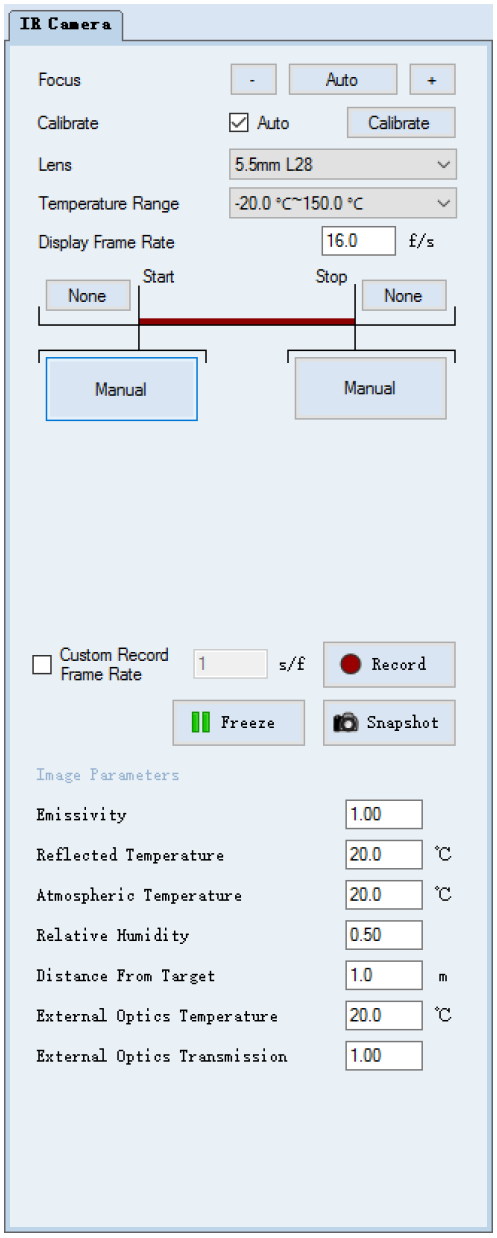


- Copy: Copy the position information of spot or area selections in the current thermal

image, which can be copied to other files.

- Display data value: Add data value onto top of the bars
- Export: Here users can choose to export the data as picture or .csv data sheet

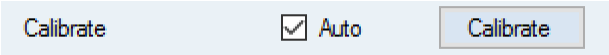
2.1.3 IR Camera Parameter Setting Panel



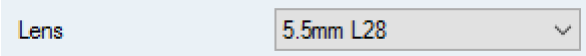
➢

The default is auto-focus. However, if

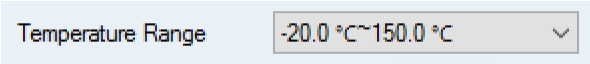
the user's camera is manual focus, there is no need to change the setting as well

➢ 

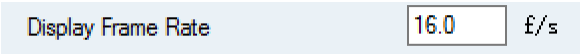
After the thermal camera is connected, click calibration to start NUC.

➢ 

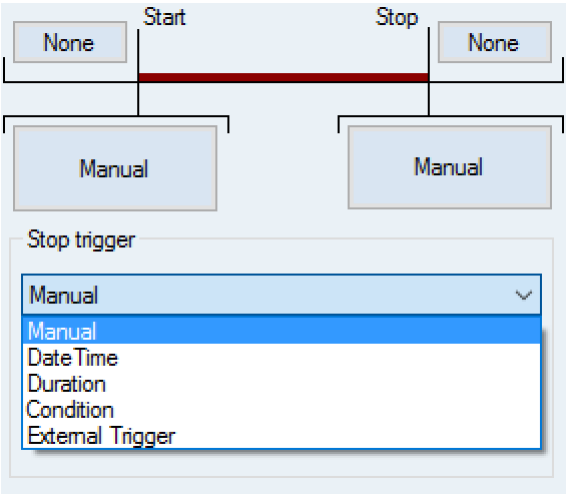
Select the lens. The default is the standard lens for the connected model.

➢ 

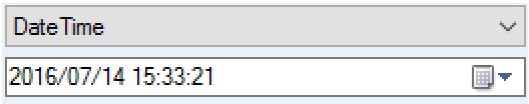
Select the temperature range according to the connected thermal camera.

➢ 

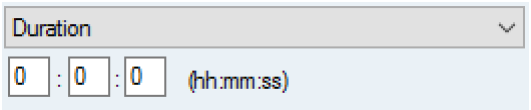
Set up frames per second (1-60).

➢ 

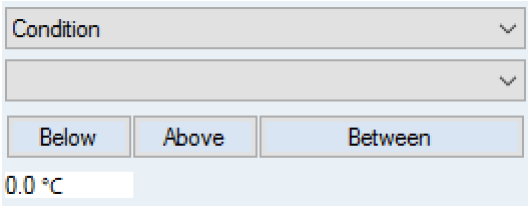
- Set up start and stop triggers to control the start and end of the thermal video recording.
- Manual: Manually trigger the device to start or stop thermal video recording; the default setting is manual.
- Date and time: Set up date and time to trigger the device to start or stop thermal video recording.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



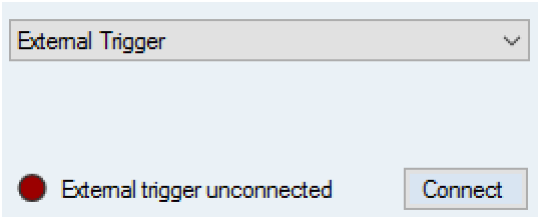
- Duration (Delay): Set up the delay time for record start triggering



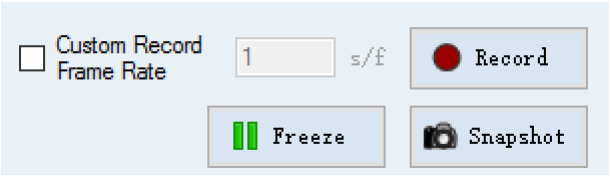
- Conditional trigger: Set up conditional trigger. Once a condition is met, it will trigger the start or stop of recording.

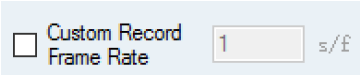


- External trigger: Connect to I/O module to trigger the start or stop of recording.



➢ **Record Thermal Video Stream**



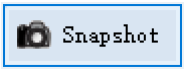
- 

User defined recording interval between frames
-

Click to start recording. After clicked, it switches to:
-

Click to stop recording.
-

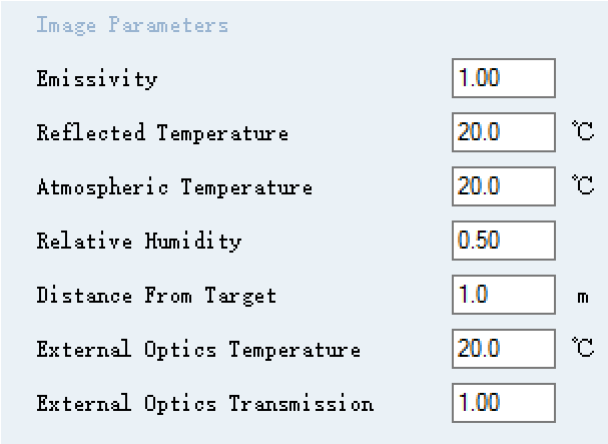
Click to freeze the current thermal image. After clicked, it switches to:
-

Click to unfreeze and display live stream of the thermal image.
- 

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

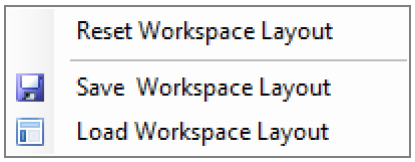
parameters.

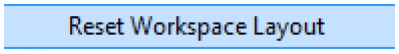


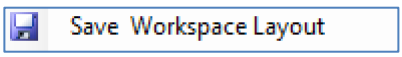
- Emissivity
- Reflected temperature
- Ambient temperature
- Relative humidity
- Distance to object
- External optics temperature (when IR window or external optics placed between thermal camera and object)
- External optics transmittance (when IR window or external optics placed between thermal camera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

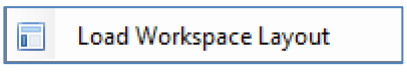
2.1.4 Page Layout

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



- 

Fill the interface with the workspace page.
- 

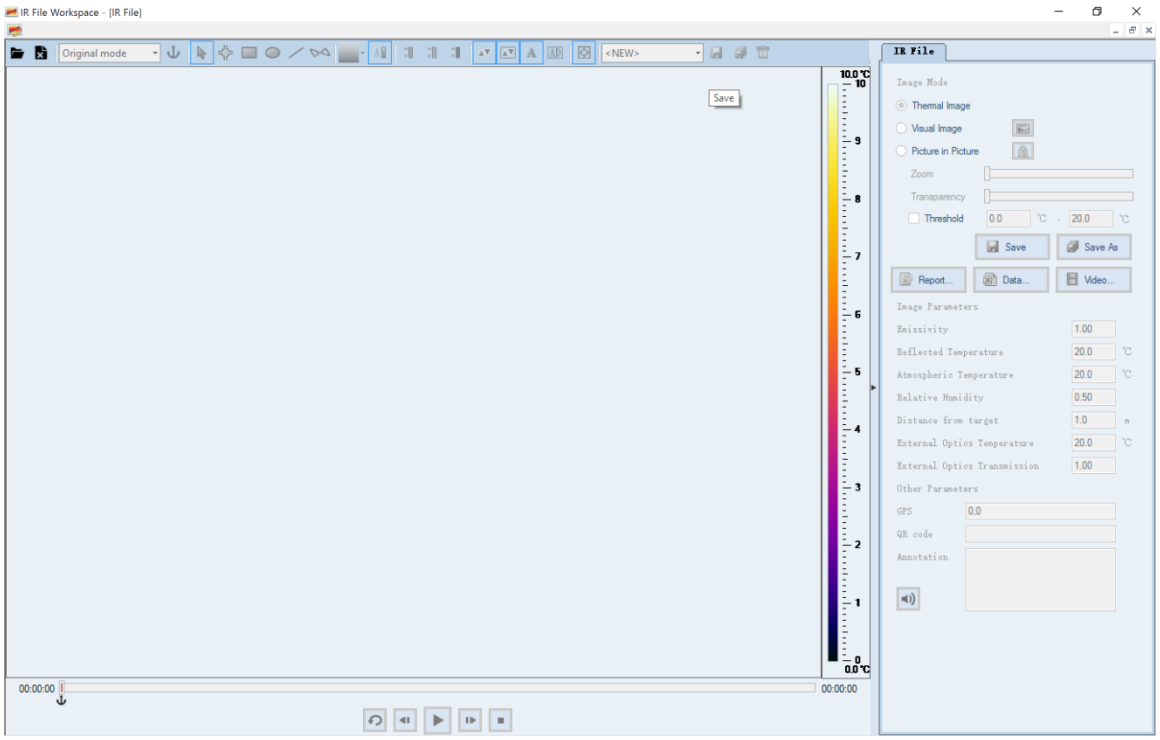
Save current interface layout.
- 

Load saved page layout.

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

2.2 IR File Workspace

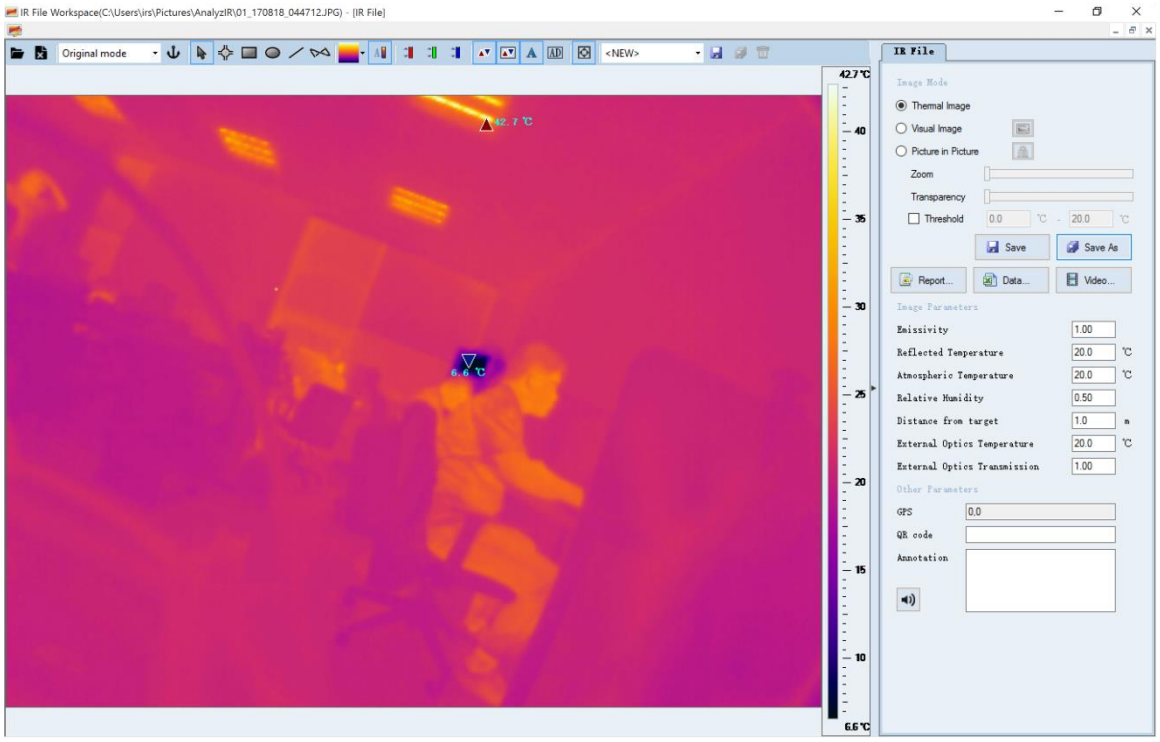
2.2.1 Main User Interface Window



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

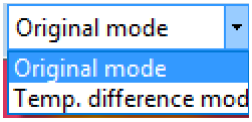
2.2.2 IR File Workspace Analysis Interface

An example of importing .IRS file



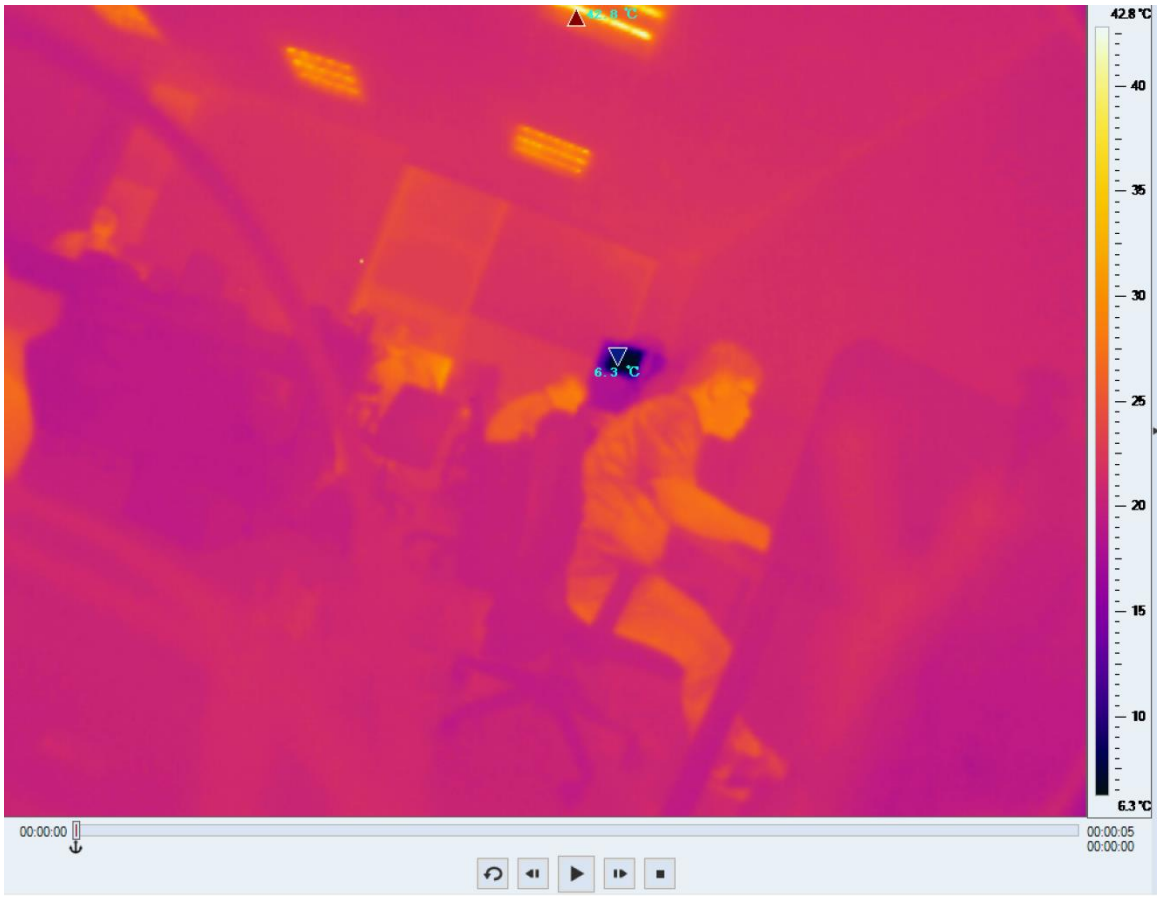
➢

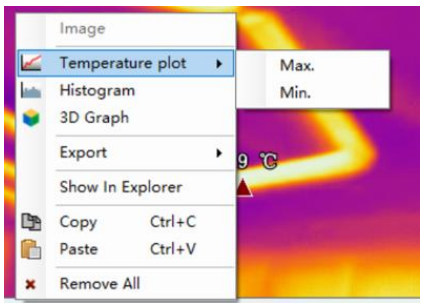
Toolbar with different analysis tools:

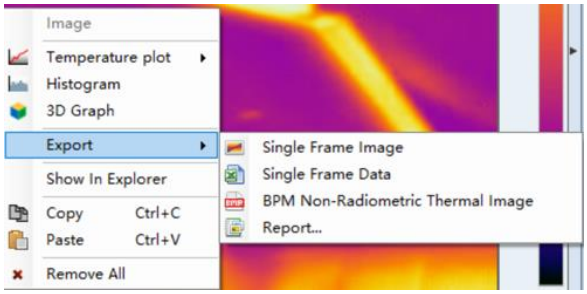
- 

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

➢ Thermal Video Display Window

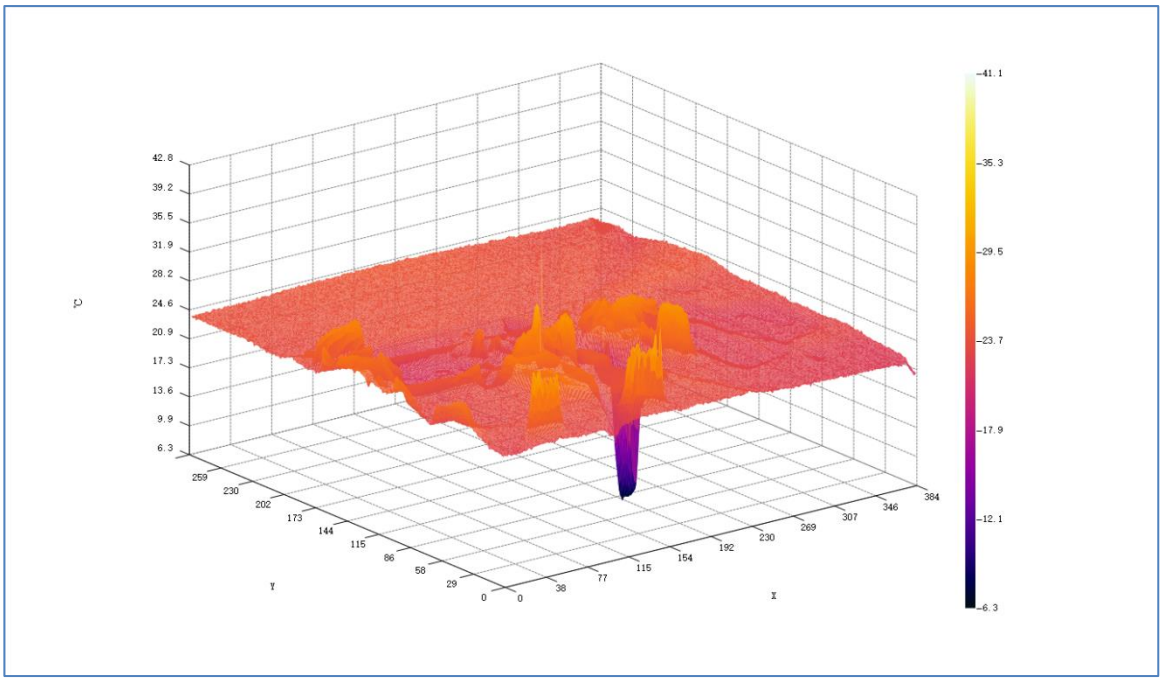






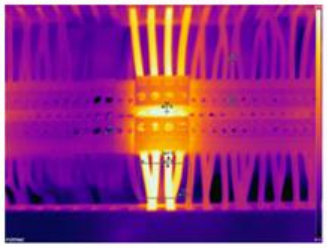
Right click on the thermal video frozen frame, you can access the following functions.

- Temperature plot: Generate the max/min temperature vs. time plot.
- Histogram: Display the histogram of temperature distribution
- 3D Graph: Display the current thermal image in 3D. You can adjust the view angle and azimuth angle to get more comprehensive observation of the 3D picture.



- Export:
  - Single Frame Image: Export current frame as a thermal image file (with temperature data and can be analyzed later).
  - Single Frame Data: Export temperature data of current frame as a .csv file.
  - BPM Non-Radiometric Thermal Image: Export current frame as a .bpm file (without temperature data and cannot be analyzed later).
  - 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 pasted to other files.
- Paste: Paste the copied information.
- Remove all: Remove all spot and area selections.

a. Inspection Images

Infrared thermal image	Visible light reference photo
	
Terminal Block III.jpg	

b. Test Environment

Test instruments	Fotric 348A#L25	Lens configurations	
Weather		Ambient temperature	20.00
Distance	3.28	Relative humidity	20.00
Emissivity	0.96	Shooting Time	2021-01-26 14:49:37

c. **Test Data**

Target	Max. temperature	Temperature rise	Note
Sp1	33.10	13.10	
Sp2	28.19	8.19	
Ar1	33.27	13.27	
Sp3	28.01	8.01	

➢

Thermal video file playback control options:

-

Click to switch display format of the video duration
  - Time difference (starting with 0)

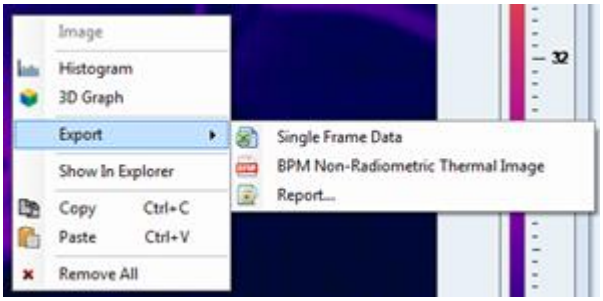
  - Real recording time (according to your computer)

  - Number of frames of the file

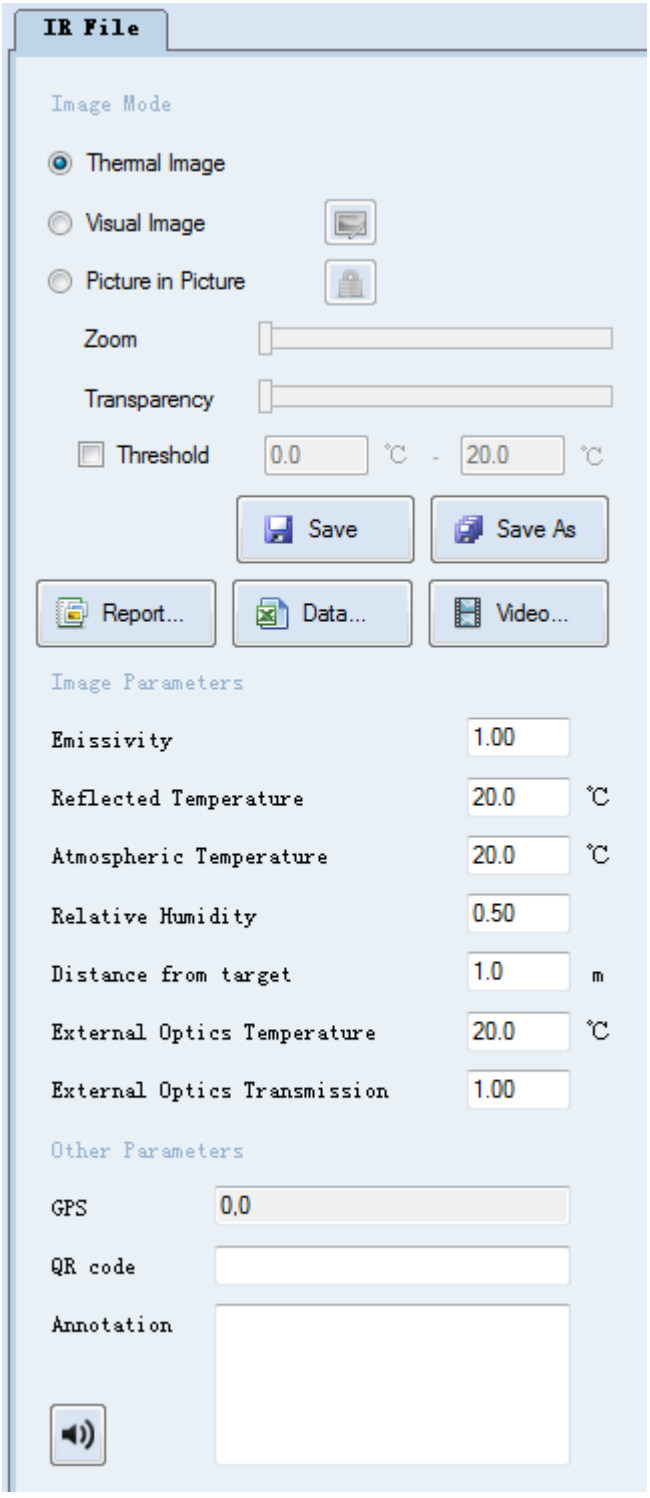
- Loop playback
- Last frame
- Next frame
- Play and pause
- Stop and revert back to the beginning

➢ Thermal Image Display Window

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



2.2.3 Thermal Image Parameter Setting Panel


IR File
Image Mode
Thermal Image
Visual Image
Picture in Picture
Zoom
Transparency
Threshold
0.0
℃
-
20.0
℃
Save
Save As
Report...
Data...
Video...
Image Parameters
Emissivity
1.00
Reflected Temperature
20.0
℃
Atmospheric Temperature
20.0
℃
Relative Humidity
0.50
Distance from target
1.0
m
External Optics Temperature
20.0
℃
External Optics Transmission
1.00
Other Parameters
GPS
0,0
QR code
Annotation

➢

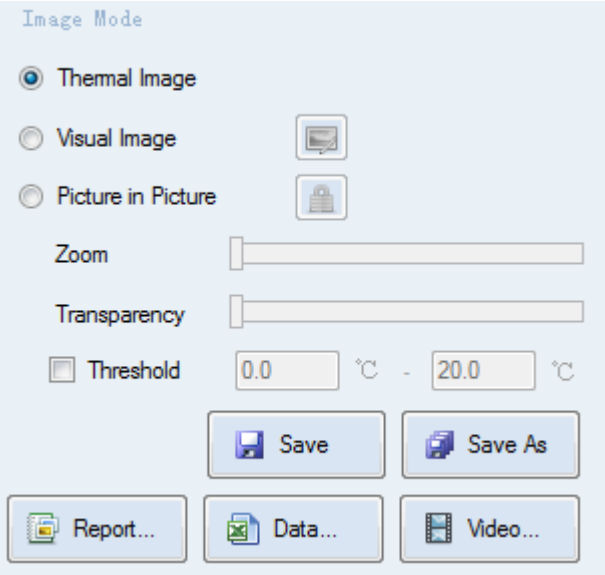
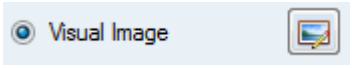
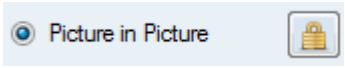


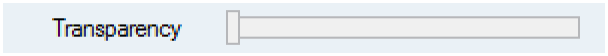
Image Mode:

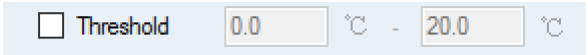
- Thermal Image: Display thermal image in the workspace window.
- 

Visual Image: Display visual image in the workspace window.
- 

Picture-in-picture: Overlap thermal picture with visual image picture
  - Click the icon to change the size of the thermal image by dragging the thermal image.

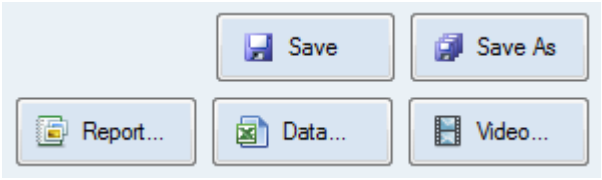
-

Zoom the image in and out.
- 

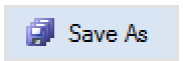
Change the transparency of the thermal image.
- 

Check to display the thermal image areas with the temperature between the defined thresholds mixed with the visible image.

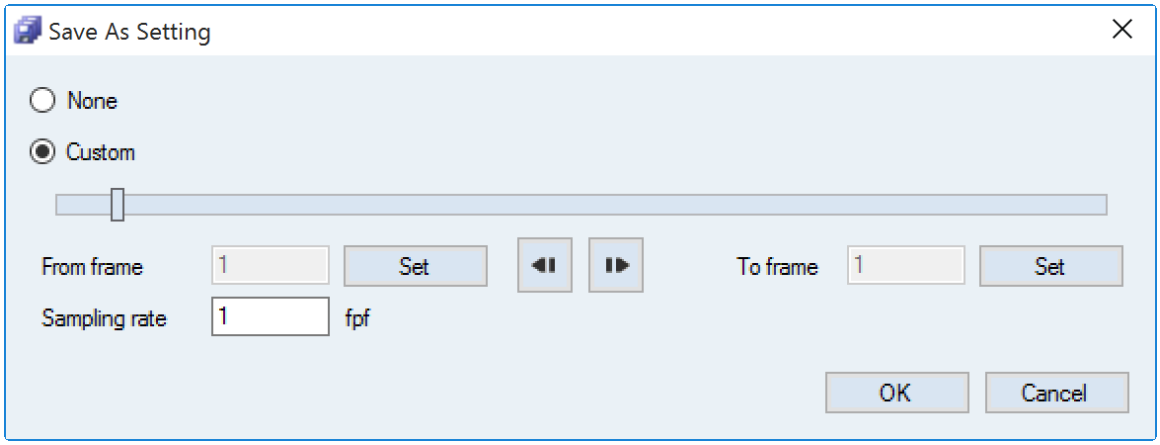
➢ Save, Save As, Report, Data Export, Video Export



-

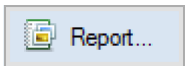
Save current thermal image with all operations to the original file.
- 

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



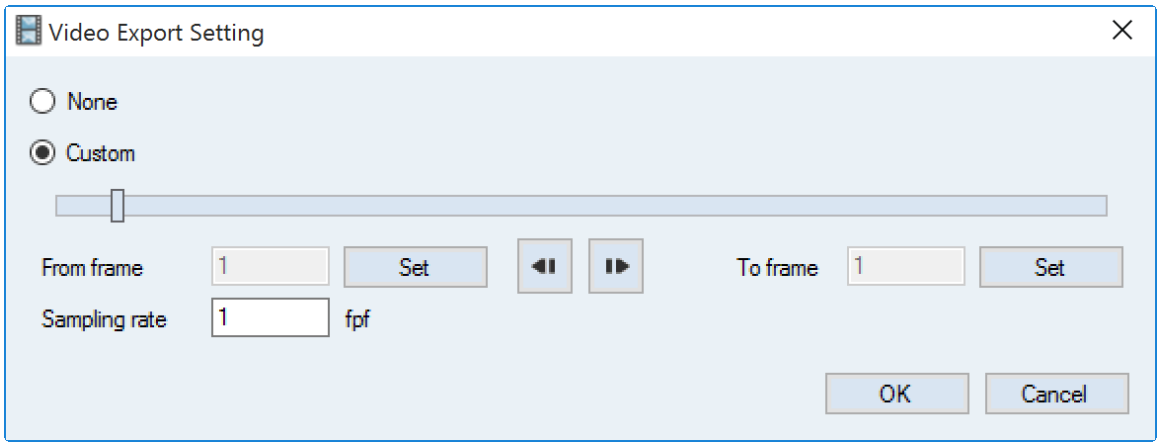
You can drag the progress bar shown; click "set" to set the start and end frames. If the progress bar keeps rolling, please close the settings screen, pause the video play, and then open.

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

- 

Export current image into a report template.
-

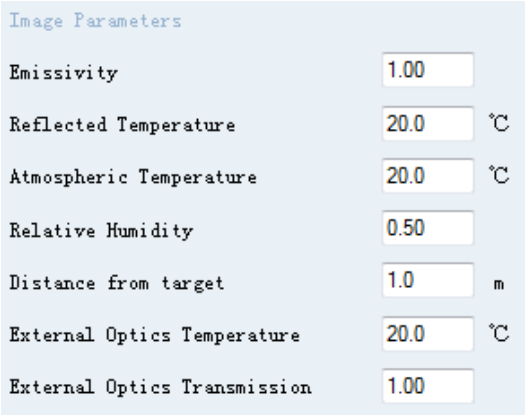
Export current file as a video file. A window pops out to configure the settings.



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.

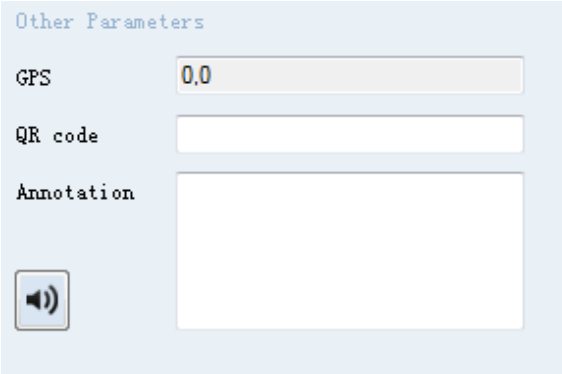
➢ Object Parameters Setting. Adjustment of these parameters directly affect outcome of

the measurements.



- 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



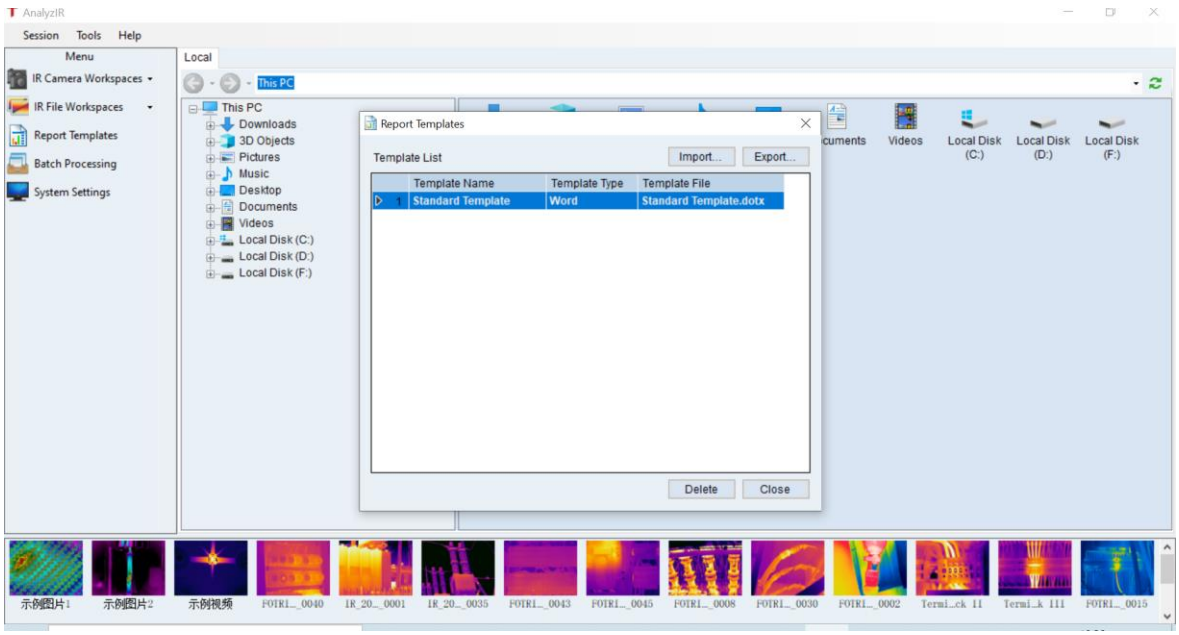
- GPS: Automatically imported data, related to the device.

- QR code: Equipment QR code.
- Annotation: Add descriptions of equipment or test.

2.3 Generate Report

2.3.1 Report Template

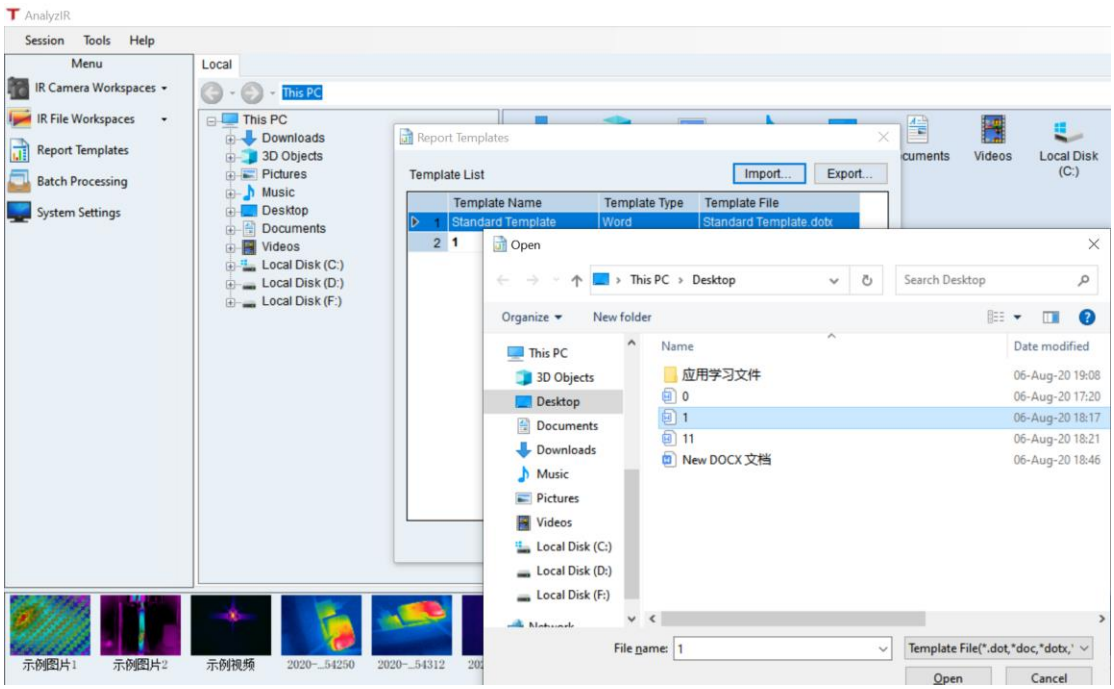
Click on the ‘Report template’ button to access the following interface.



Import template

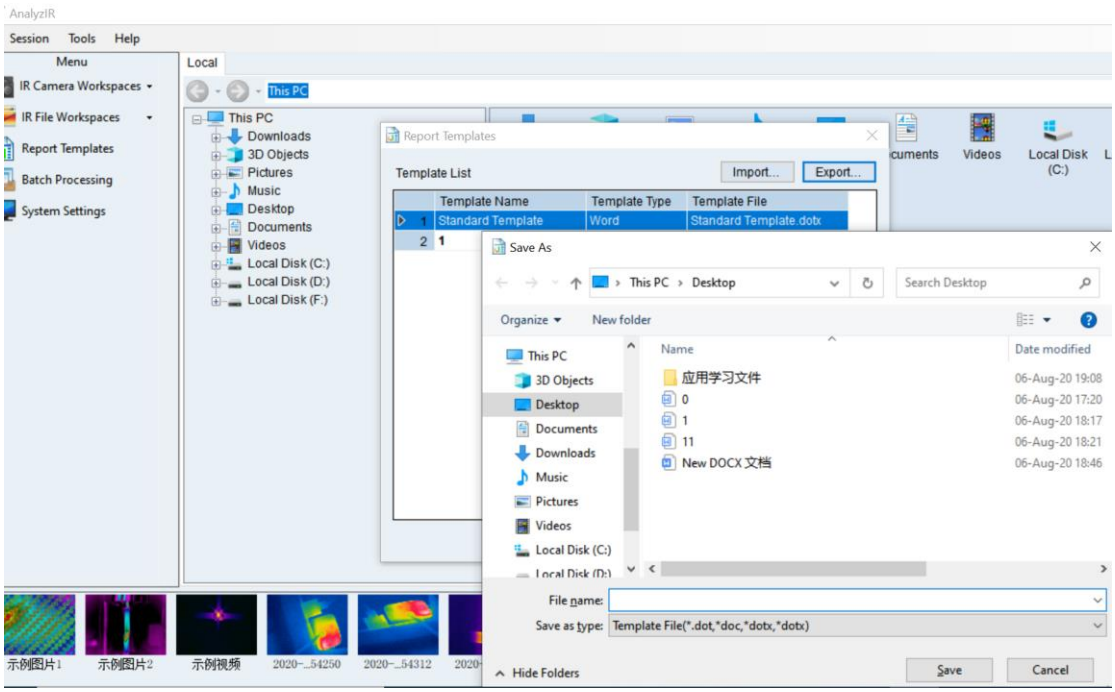
Click : import.. - open folder- click open - complete template import.

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



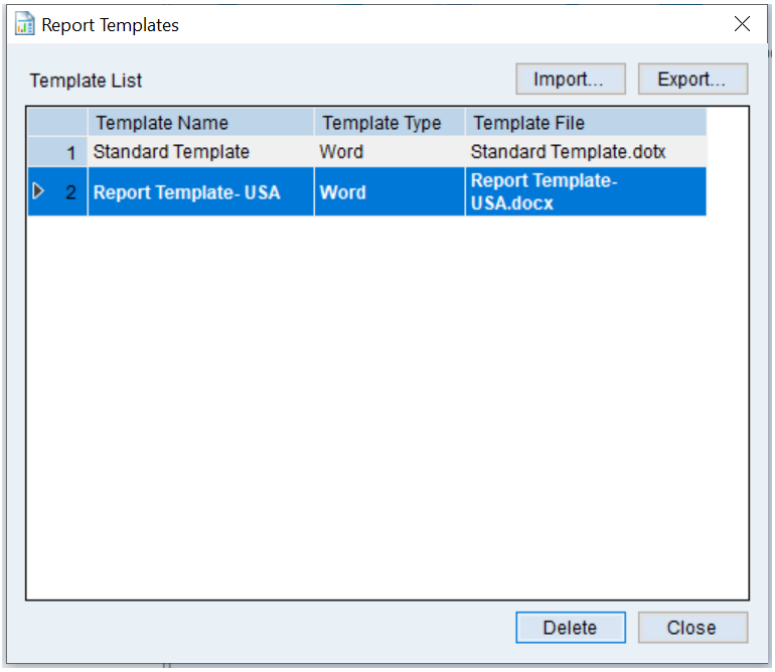
Export template

Click : export.. - open folder- input name and click save - complete template export.



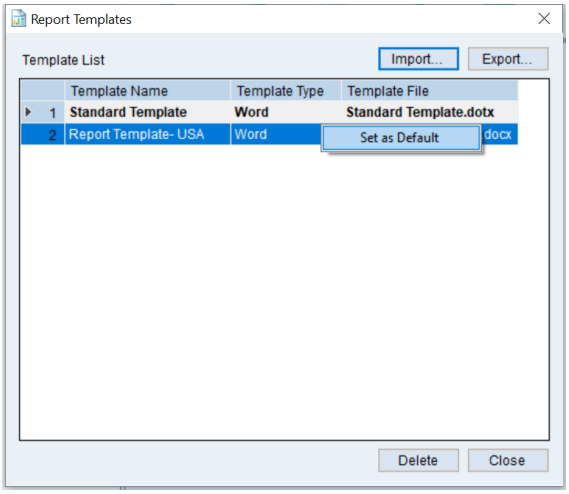
Delete template

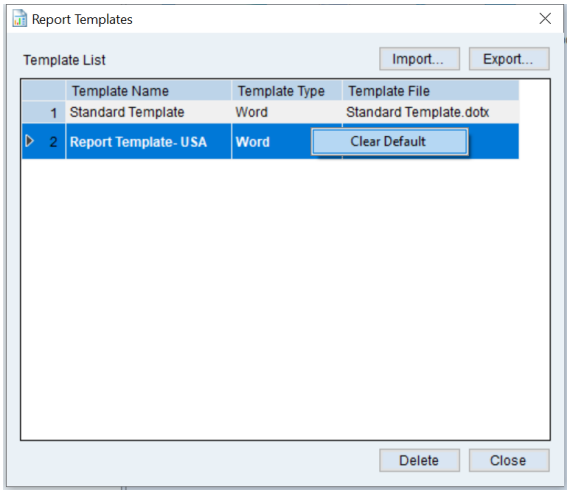
Click delete button to delete report template.



Set/Cancel default template

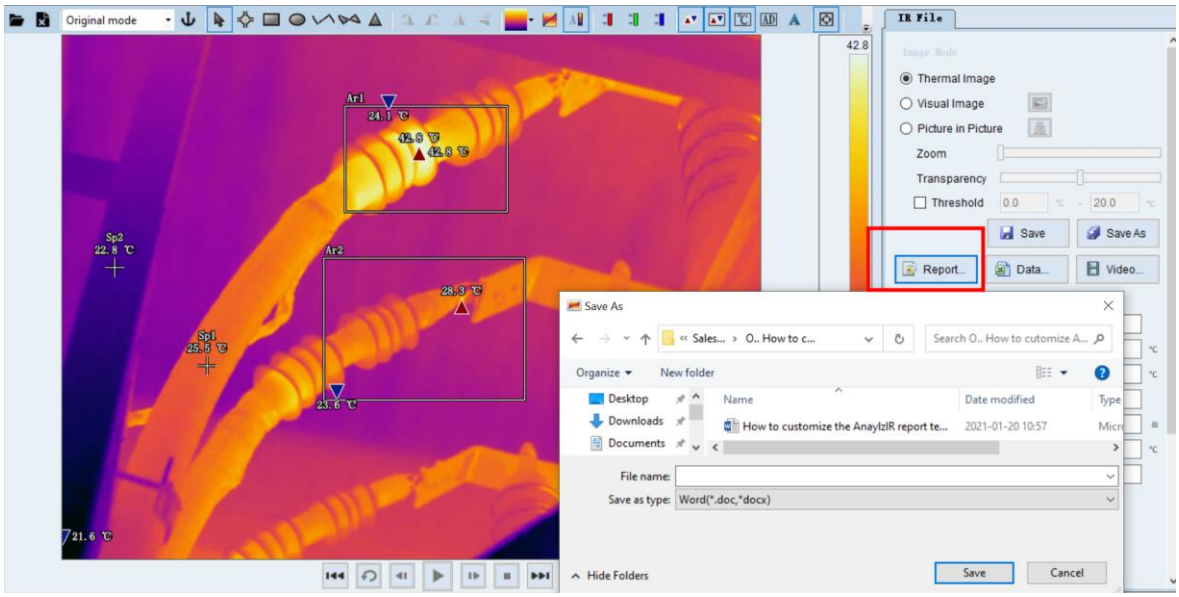
In the template list interface, right click on the template file to set or cancel its 'default template' status. After set as default, all reports' content will be generated in default template's pattern.



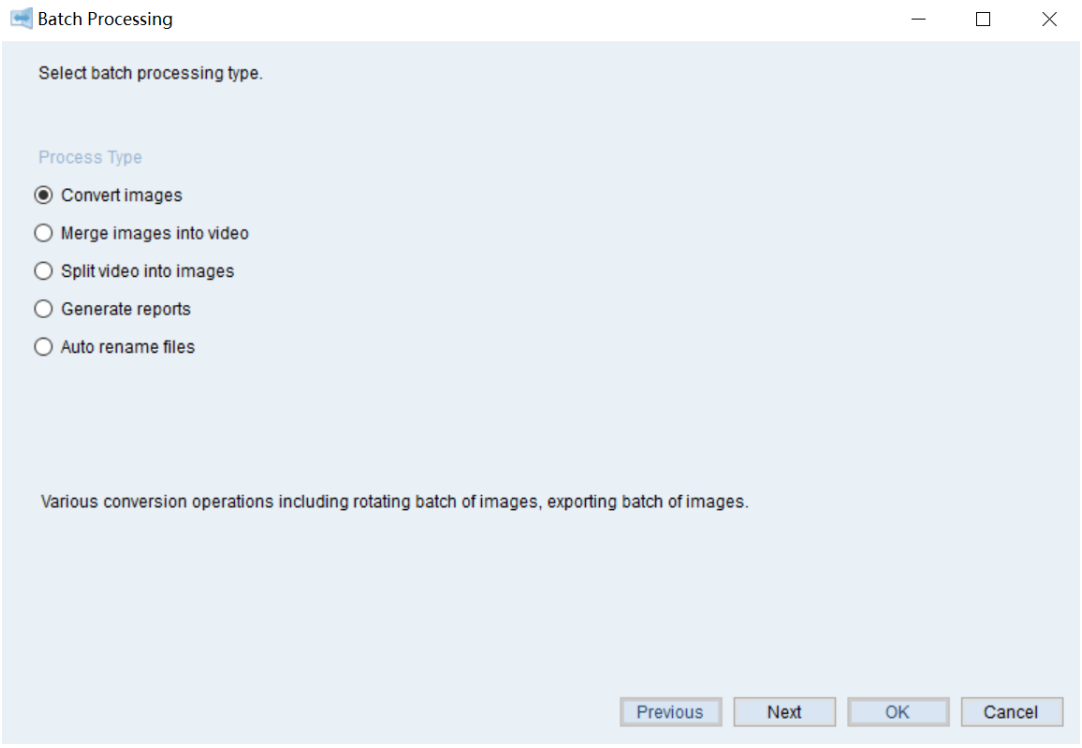


2.3.2 Generate Report

Click Report button to generate report from template.



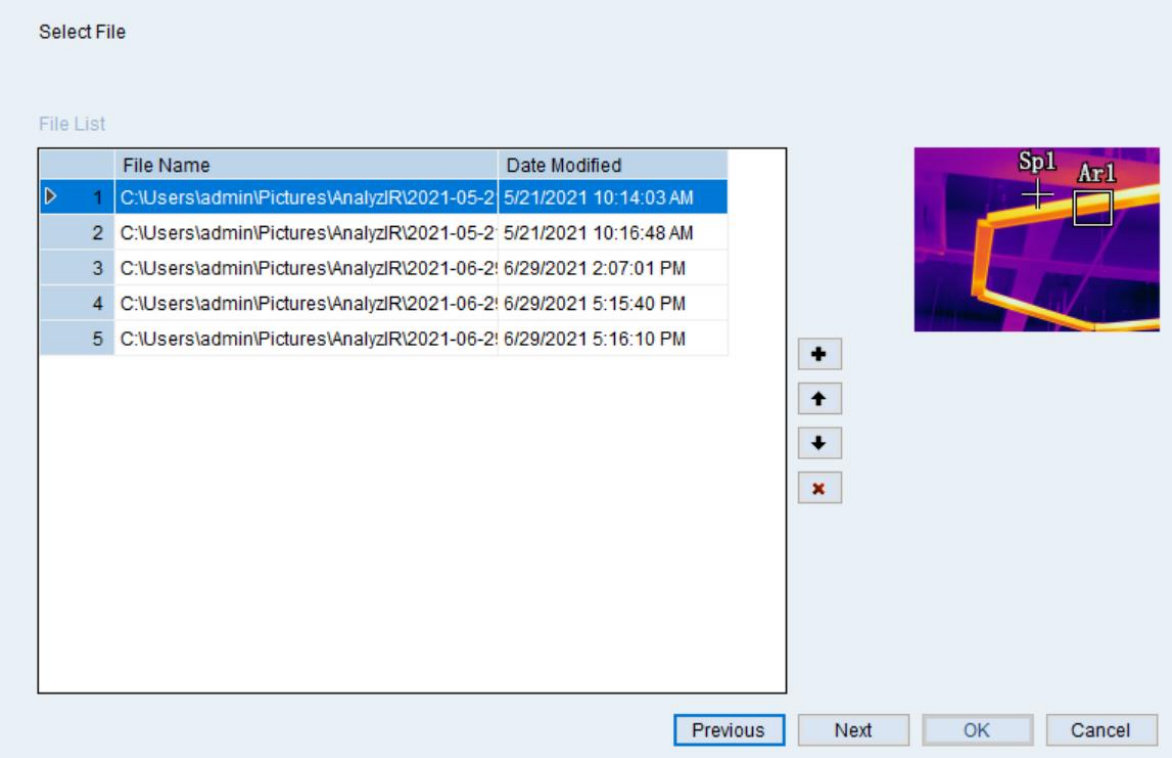
2.4 Batch Processing



2.4.1 Convert Images

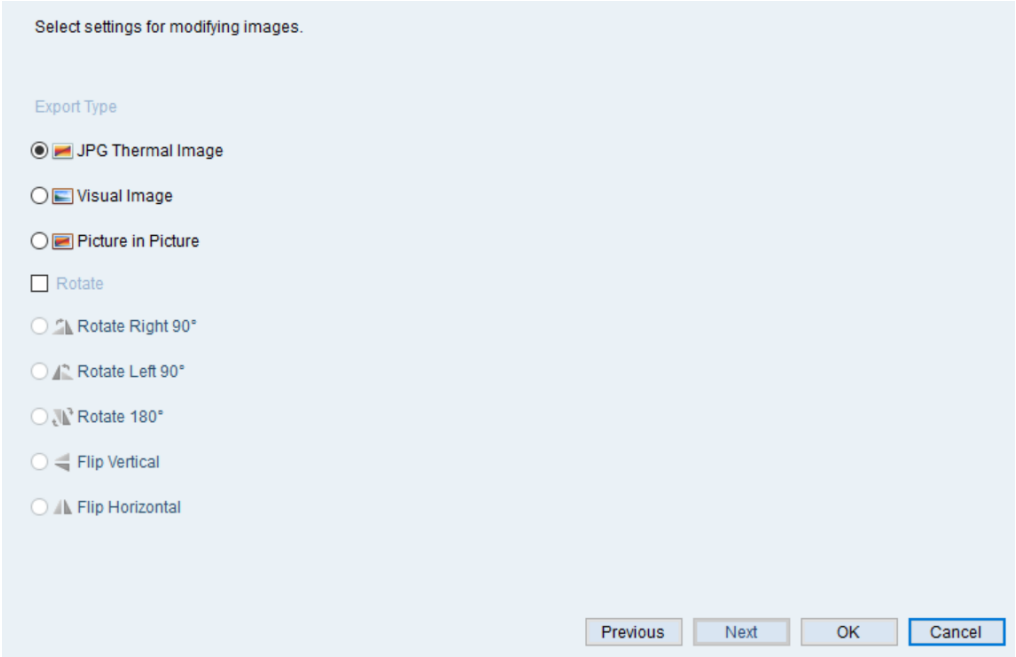
This function allows user to export different types of images (thermal, visual and fusion),

and rotate or flip the images



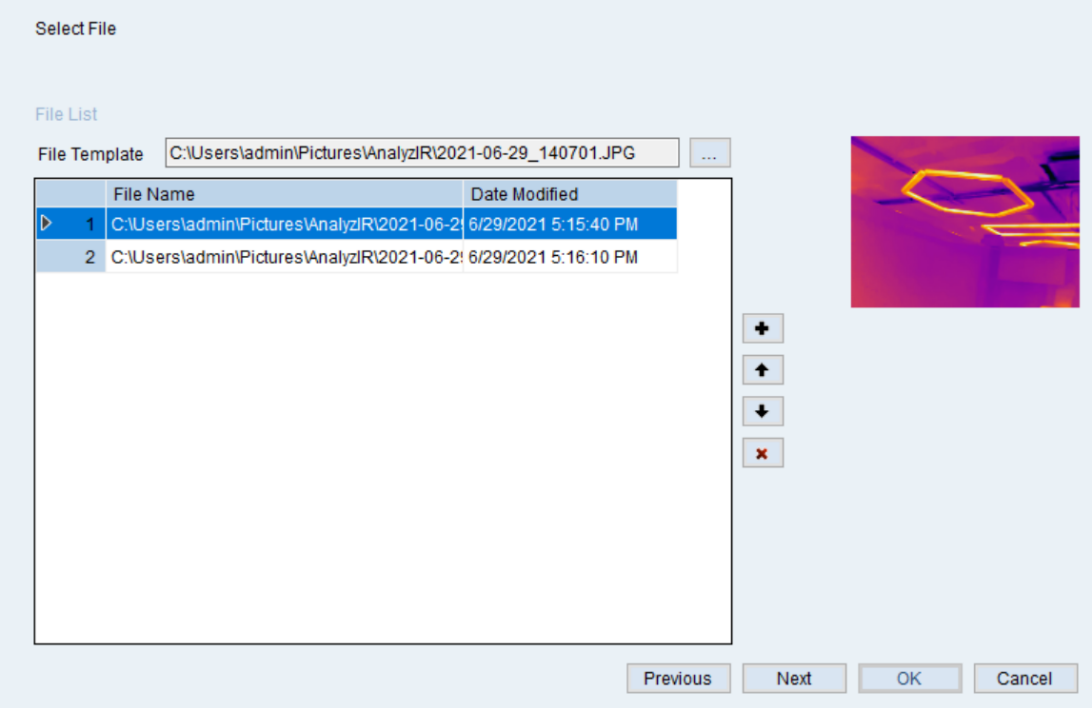
- Add thermal image files (cannot add visible image).
- Move up the image file location.
- Move down the image file location.
- Delete the selected thermal image file.

After adding the images, click on ‘Next’ to enter the next page


Select settings for modifying images.
Export Type
JPG Thermal Image
Visual Image
Picture in Picture
Rotate
Rotate Right 90°
Rotate Left 90°
Rotate 180°
Flip Vertical
Flip Horizontal
Previous
Next
OK
Cancel

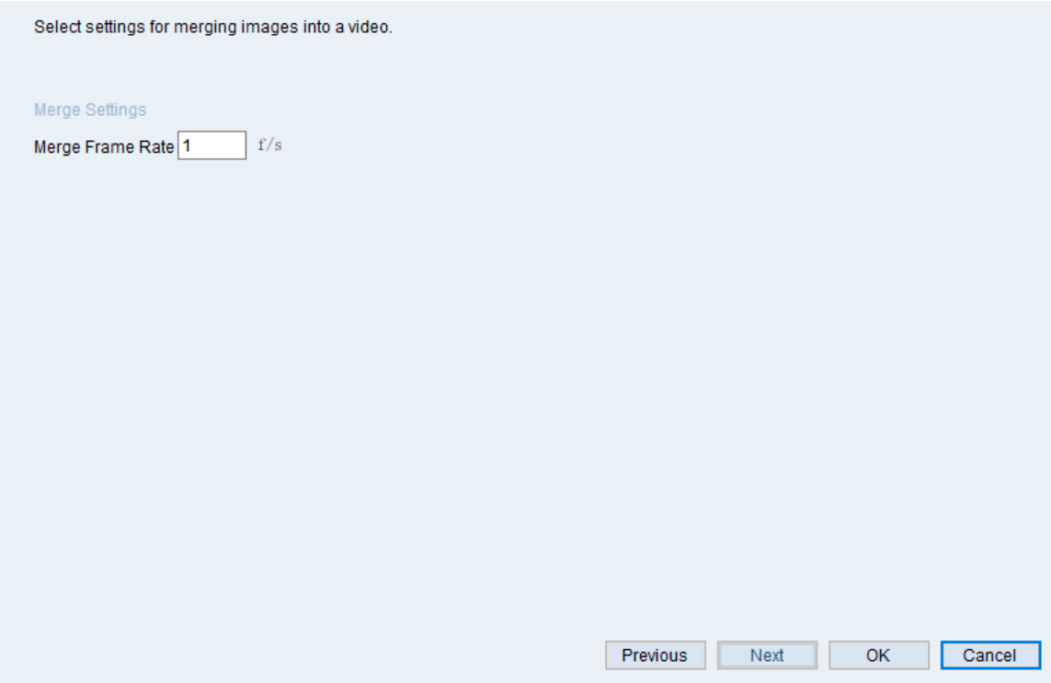
2.4.2 Merge Images into Video

This function allows user to merge different thermal images taken by a same thermal imager into a radiometric thermal video



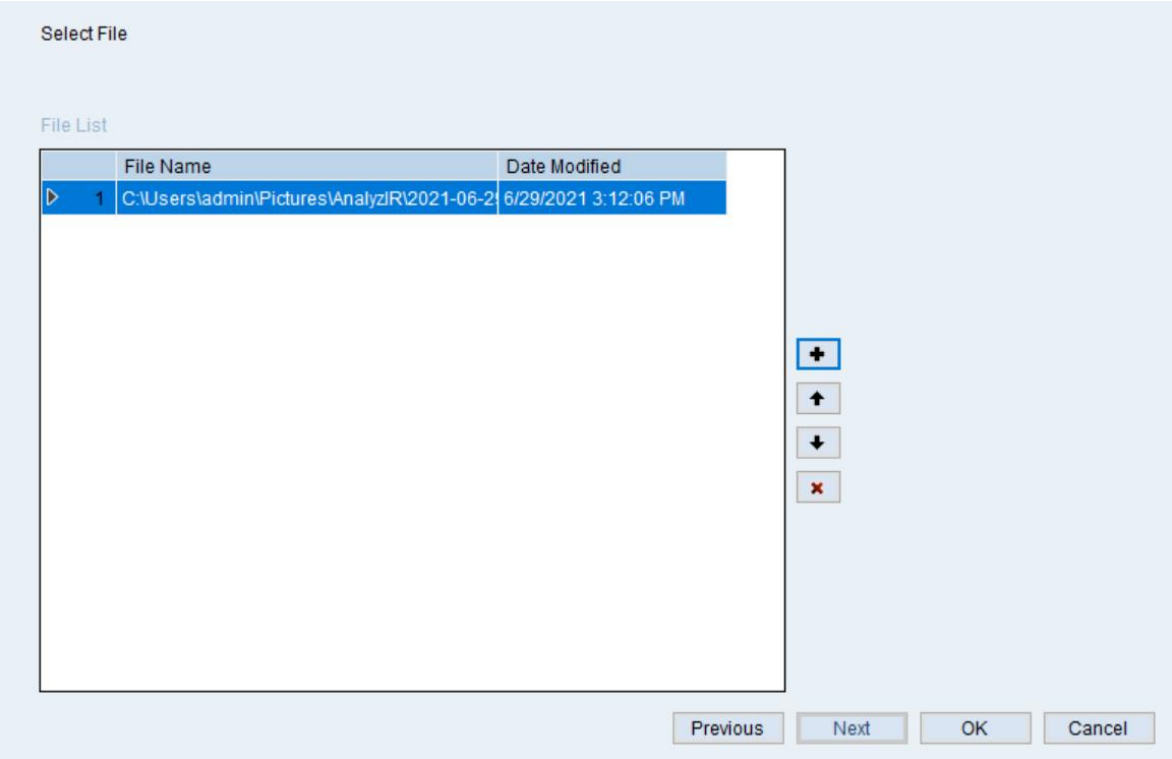
- File template: Select the start image/video file (thermal image file or .IRS file). Added files must be taken from the same thermal camera as the file template.
- Add thermal image/video files (cannot add visible image). Added files must be taken from the same thermal camera as the file template.
-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

Select the appropriate frame rate, and click “OK” to finish the process.



2.4.3 Split video into images

This function allows user to break up a radiometric thermal image into thermal images of each frame.

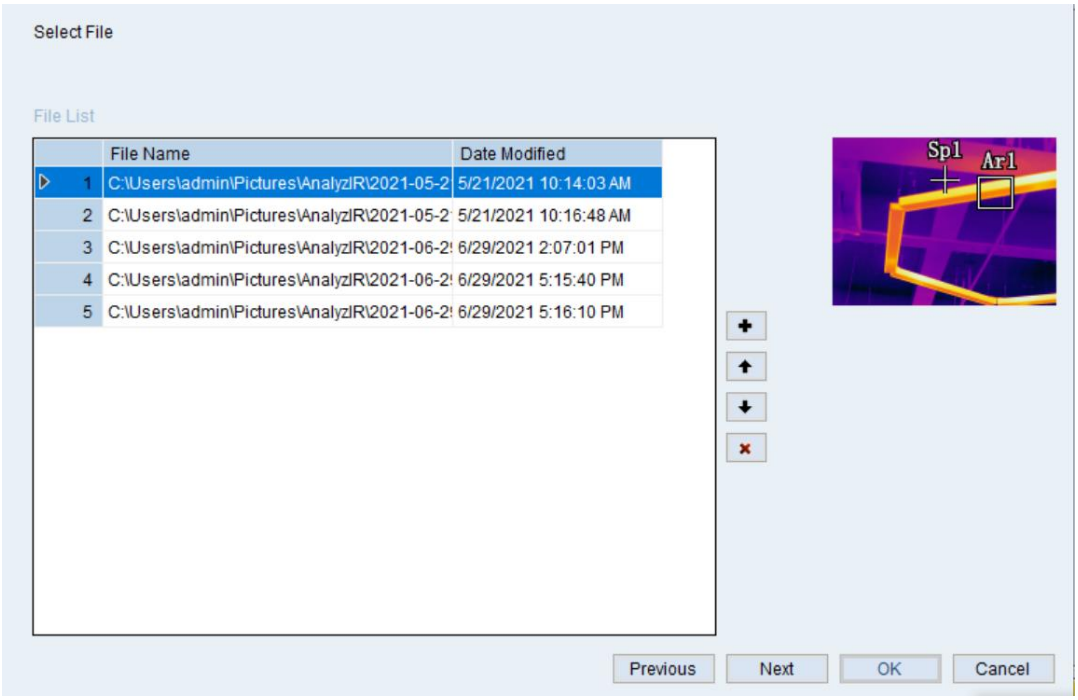


- Add radiometric video
- Move up the video file location.
- Move down the video file location.
- Delete the selected thermal video file.

Then click 'OK' to select a path for storing the thermal images and finish the process

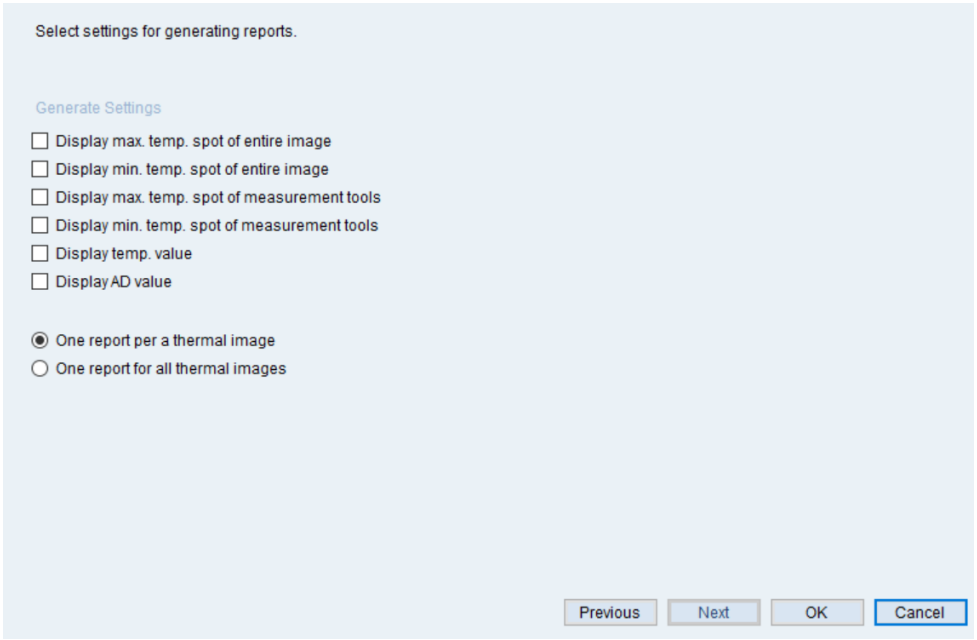
2.4.4 Generate reports in Batch

This function allow user to generate word file reports in batch. It supports generating up to 200 thermal inspection reports. The reports could be the form of one giant word file or each image having their own report file.



- Add thermal image (cannot add visible image).
- Move up the image file location.

- Move down the image file location.
- Delete the selected thermal image file.

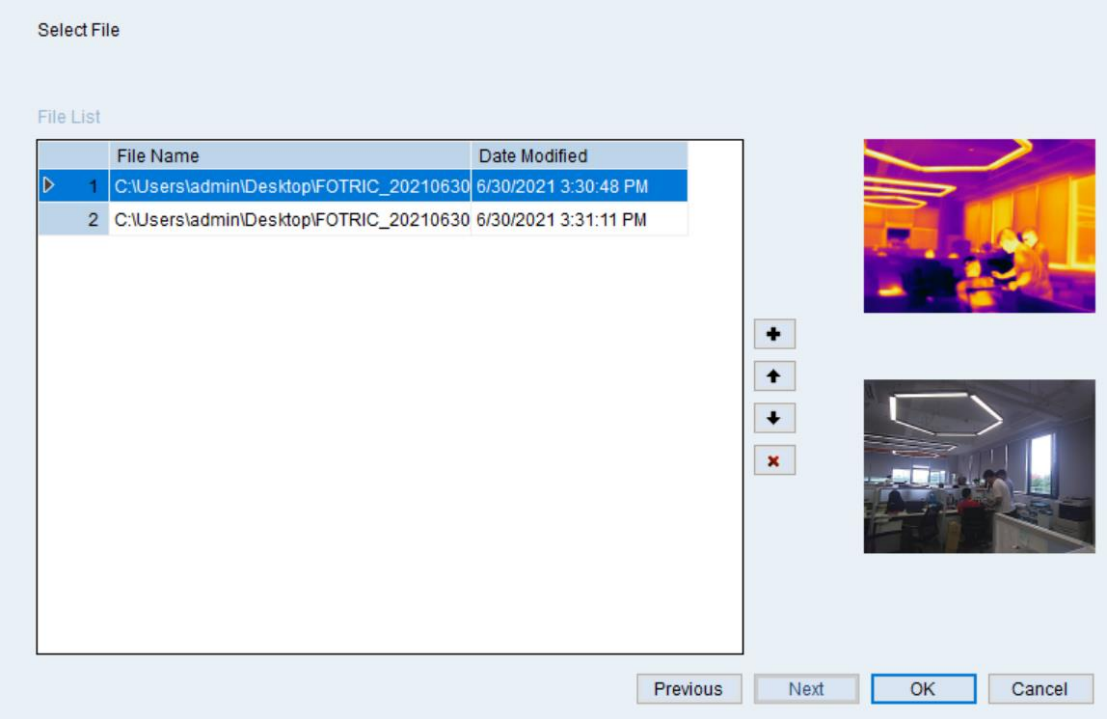


Click ‘Next’ to advance to the next interface. Select preferences and click ‘OK’

Note: Choosing ‘One report per thermal image’ would by default naming the report files by the time they are generated and placing them in the same file as the thermal images; Choosing ‘One report for all thermal images’ gives user the liberty of naming and choosing the path for the report file

2.4.5 Auto naming files

This function only applies for image affiliated with ‘tag’. It appends the content of tags to the names of the pictures.

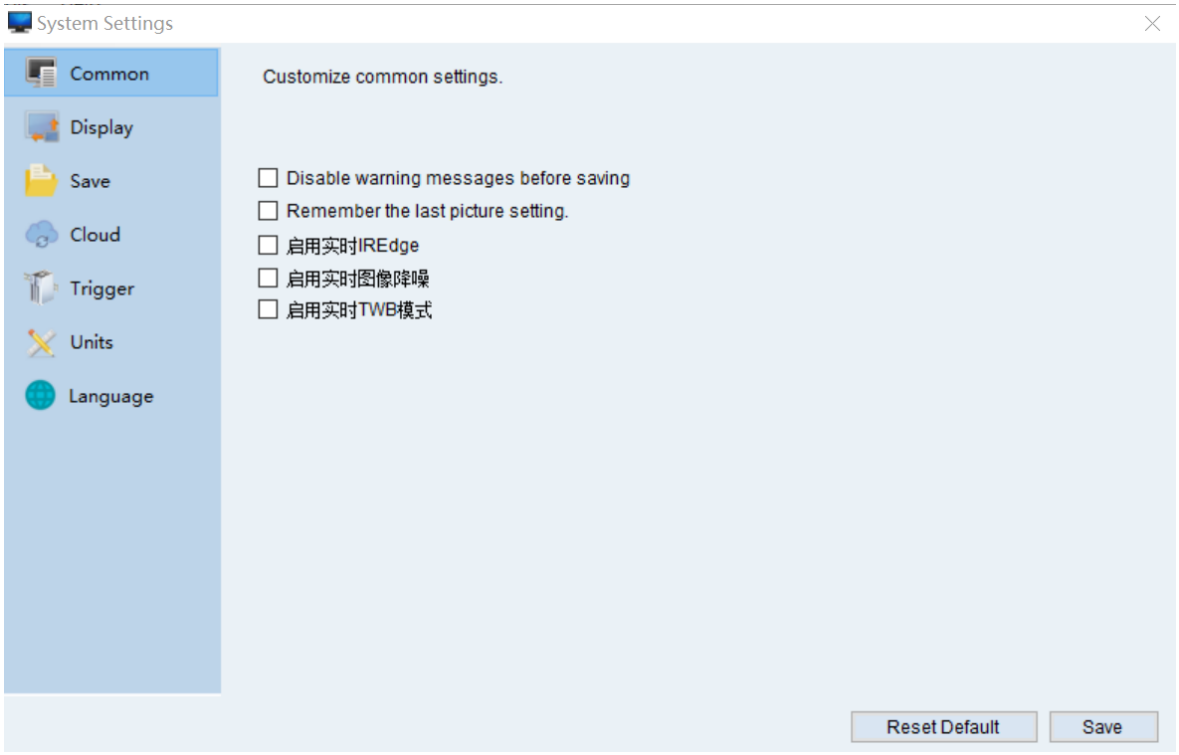


- Add thermal image (cannot add visible image).
- Move up the image file location.
- Move down the image file location.
- Delete the selected thermal image file.

Click ‘OK’ to browse path for storing the renamed images.

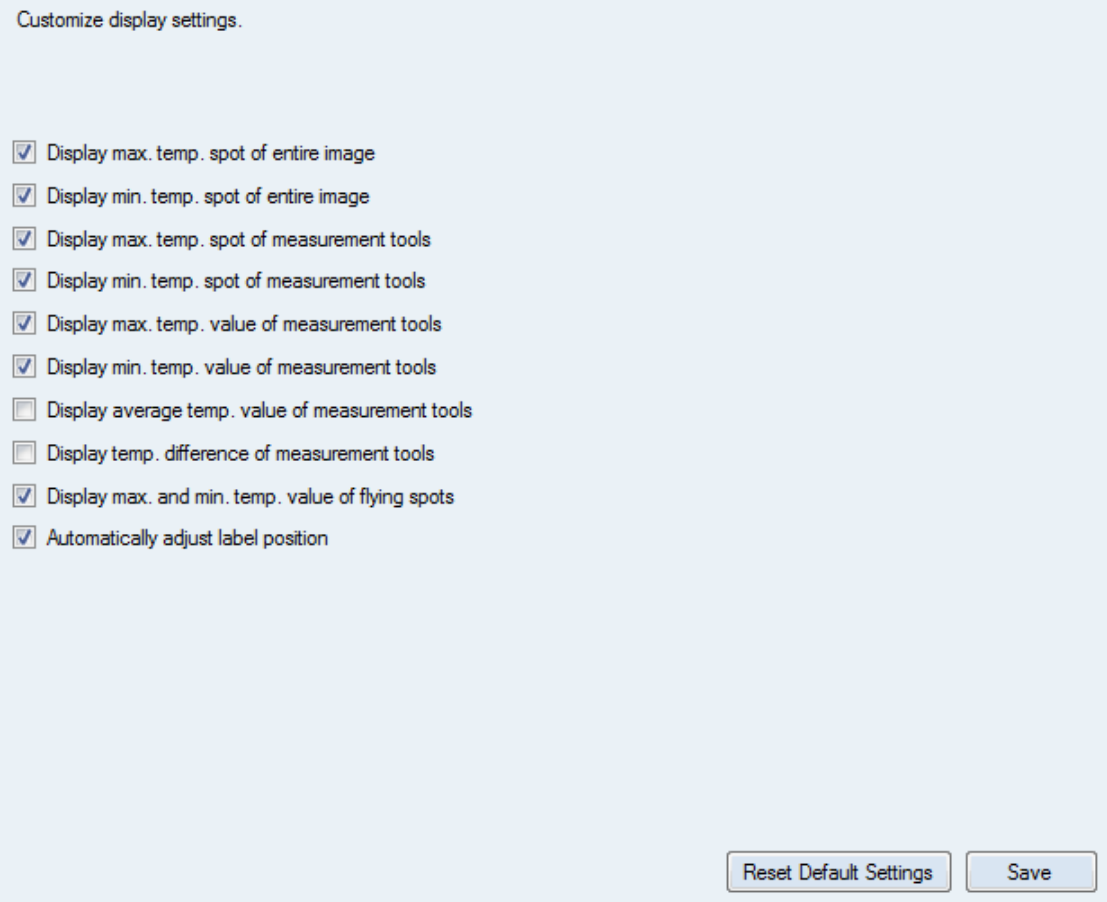
2.5 System Settings

2.5.1 Common



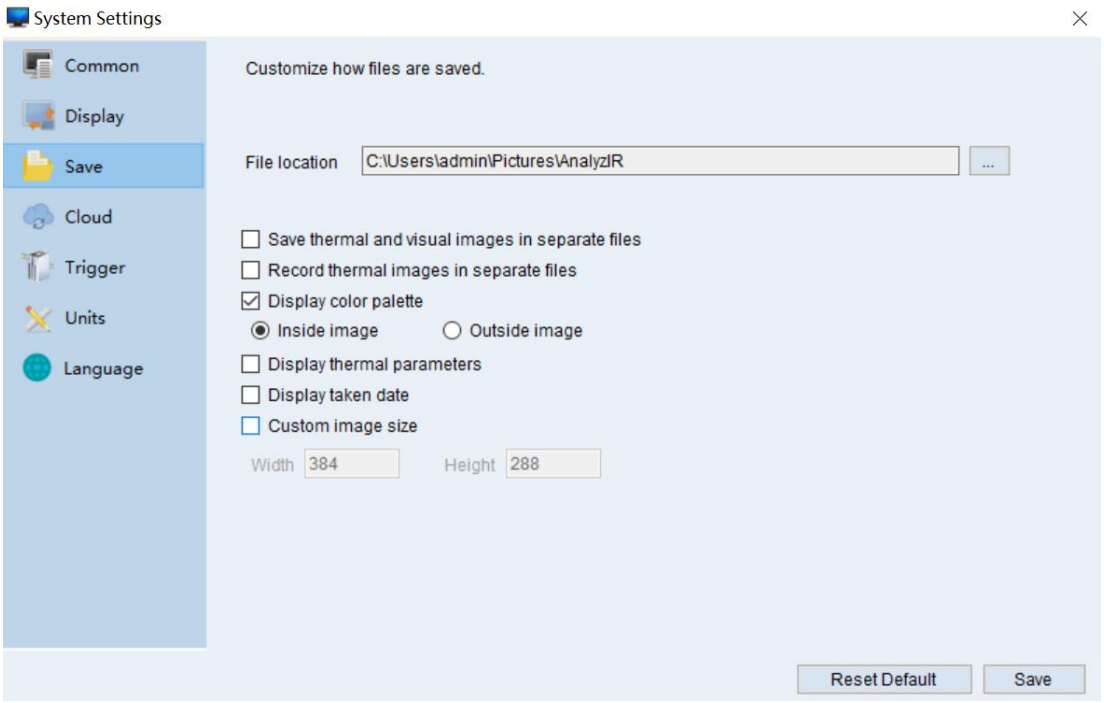
- Disable warning messages before saving After checked, no warning messages will pop up before saving.
- Remember the last picture setting. After checked, the software will save the settings for the last picture it edited and apply them upon next start.
- 启用实时IREdge After checked, the software will activate 'IREdge', the algorithm making lines and edges in the picture look more defined.
- 启用实时图像降噪 After checked, the software will activate 'Denoise' function that makes the whole picture looks smoother
- 启用实时TWB模式 After checked, the software will activate 'Thermal White Balance' function that balances color distribution on entire temperature span of the image.

2.5.2 Display

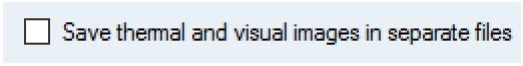


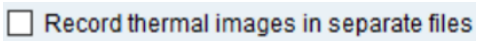
Options to set up the data display in workspaces.

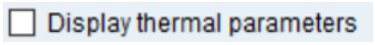
2.5.3 Save

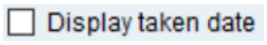


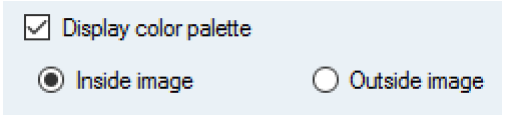
Set up the default folder to save files:

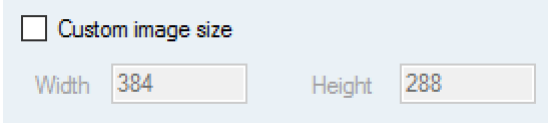
- 

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

After check, the software will save every frame of a video as image individually
- 

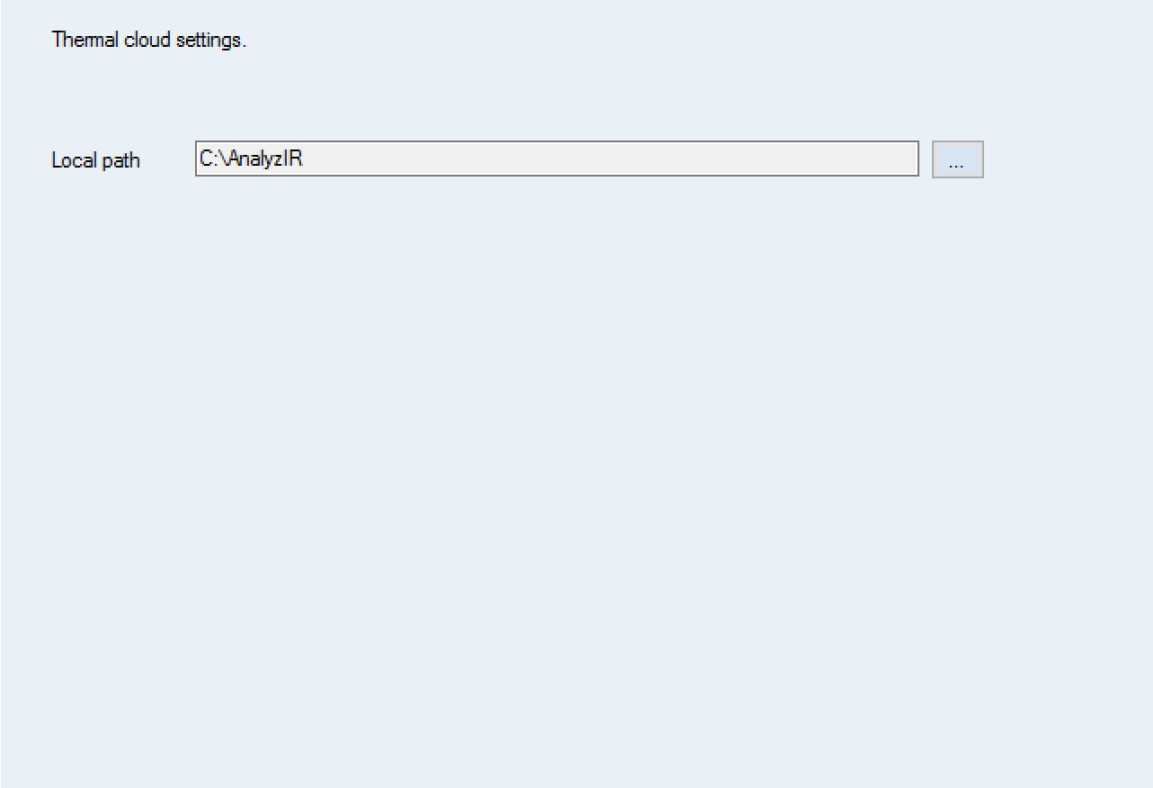
Include measurement parameters in the saved picture
- 

Include picture taken date in the saved picture
- 

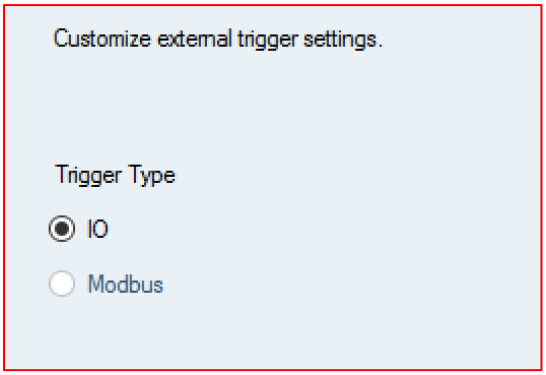
Locations of temperature color bar display.
- 

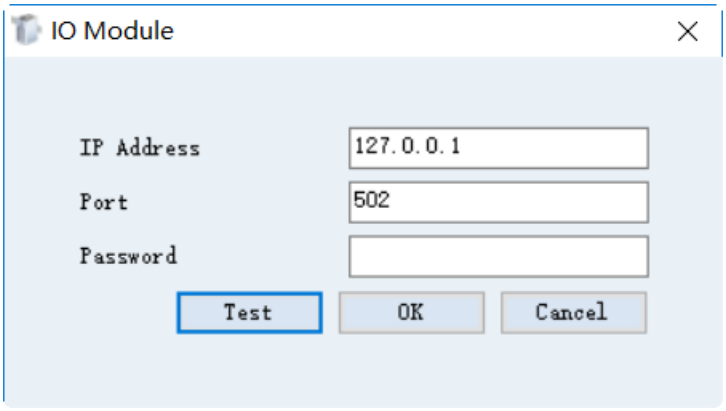
User defined image size (pixels).

Note: Width and Height must be even numbers.


Thermal cloud settings.
Local path
C:\AnalyzIR
...

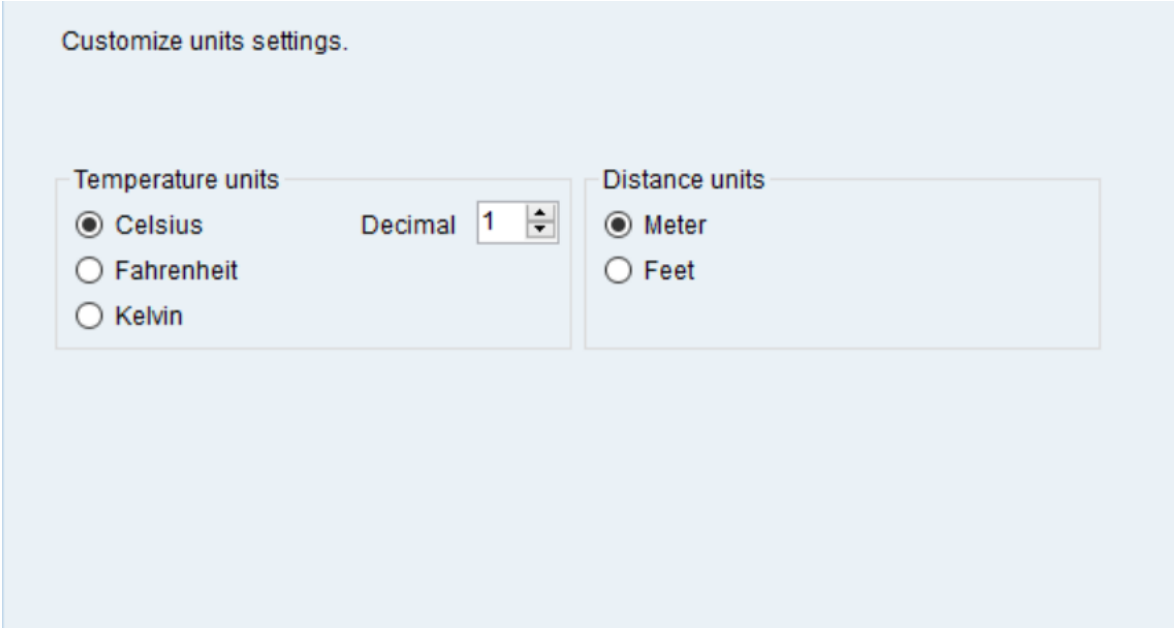
2.5.4 Trigger


Customize external trigger settings.
Trigger Type
IO
Modbus



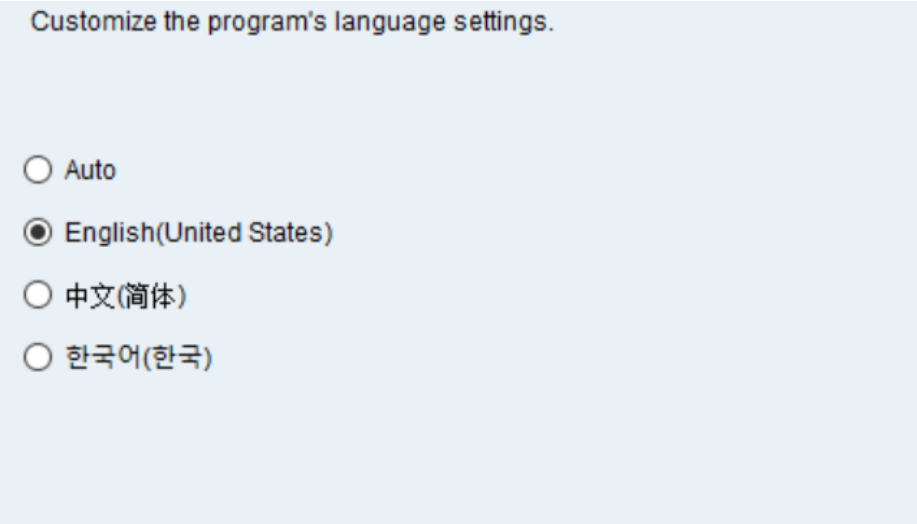
Connect to external modules. Control the start and stop of thermal video recording in IR Camera Workspace.

2.5.5 Units



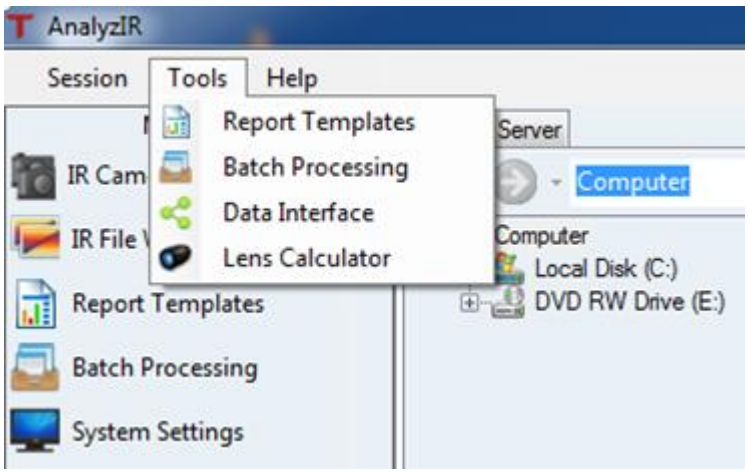
Set up temperature and distance units of workspaces. The default is “Celsius” for temperature and “Meter” for Distance.

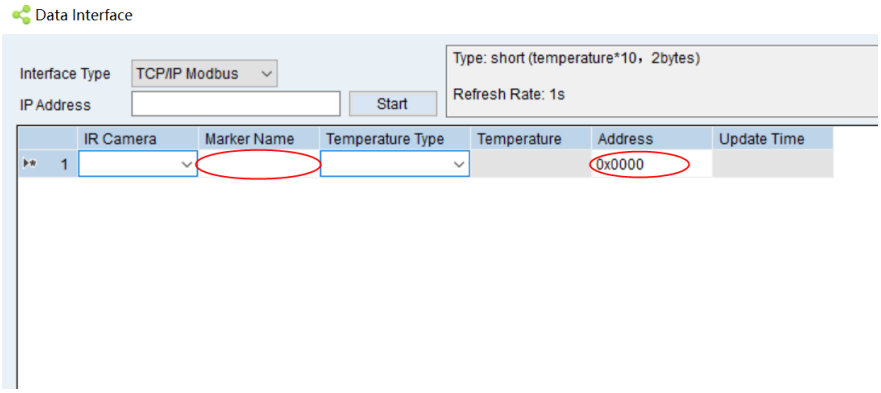
2.5.6 Languages



Select the language of the user interface. The default is “Auto,” which is the same as the display language of the operation system.

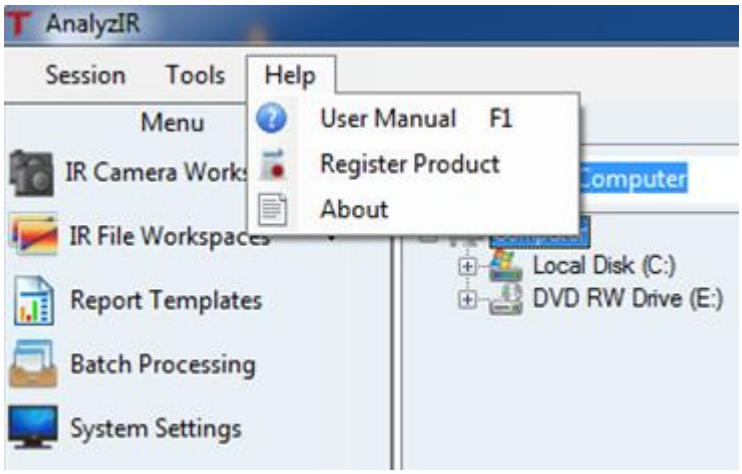
2.6 Tools





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

2.7 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.

2.8 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 (℃)	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℃	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

Appendix B

How to customize report template

1. Bookmarks Introduction

The image shown below is what the standard report template looks like:

****Report

Report Number:

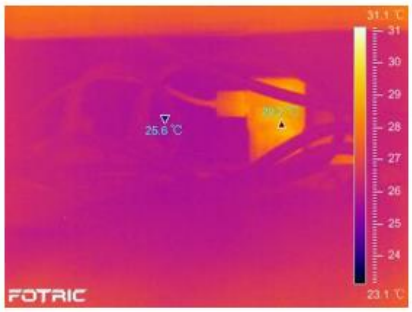
1. Basic Info

Company		Department	
Contact		Phone	
Address			

2. Measured Info

a. Test Image

Thermal Image



Visible Light Image

[Image Name]

b. Test environment

Device	[device]	Lens	
Weather		Ambient Temp	[at]
Distance	[distance]	Relative Humidity	[rh]
Emissivity	[emissivity]	Date and Time	[shooting time]

c. Test Data

Target	Max Temperature	Temperature rise	Note

During the report generating phase, the AnalyzIR software will search for all the bookmarks in the template file, and fill in all the parameters and measurements onto the respective bookmarks.

Note: when assigning bookmarks to texts in the template, please remember to highlight the texts

Available bookmarks are listed below:

Type	Bookmarks name	Note

irFile	“index”	
	"filename"	
	"annotation"	
	"em"	Emissivity
	“at”	Ambient temperature
	"rt"	Reflected temperature
	“rh”	Relative Humidity
	"distance"	Distance from the object
	"eot"	External optic’s temperature
	"eoe"	External optic’s emissivity
	"latitude"	
	"longitude"	
	"cameramodel"	
	"cameraseriesno"	
	"qrcode"	QR code information
	"shottime"	Capture time of the images
	"irimage"	Thermal image
	“dcimage”	Visible 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(partial) emissivity
	"maxt"	Max temperature
	"mint"	Min temperature
	"avgt"	Average temperature

Here are the rules for bookmark setting:

1) Bookmarks cannot exist independently. Users have to declare the type of bookmark by appending it to a type name via ‘_’. For example: ‘irfile_dcimage’ will set up a bookmark that will display the visible image later in the template

2) ‘irfile’ stands for innate information contained in the thermal image. ‘marker’ stands for

user-made measurement tools, such as line, ellipse, rectangle and point.

3) Because there can be multiple measurement tools in an IR file, they can be represented and manipulated by loop logic in the table below.

Bookmarks loop statement				
Bookmarks statement Include Loop, search, calculate and so on				
Type	Statement		Meanings	For example
Loop	o		Outer loop	o_marker
	i		Inner loop	i_irfile
Search	s	gt >	More than..	s_ marker_gt_30
		get >=	More or equal to..	
		lt <	Less	
		let <=	Less or equal to..	
		et =	Equal to..	
Calculation	add		Add	marker_maxT_add_irfile_at
	sub		Minus	
	mul		multiply	
	div		Divided	

- The outer loop repeatedly creates tables based on the number of the looped object. For example, if the bookmark is “O_marker”, then each marker in the IR file will generate an information table.

- The inner loop will repeatedly create rows of a table. For example ‘I_marker’ will record

information of each marker on an individual row.

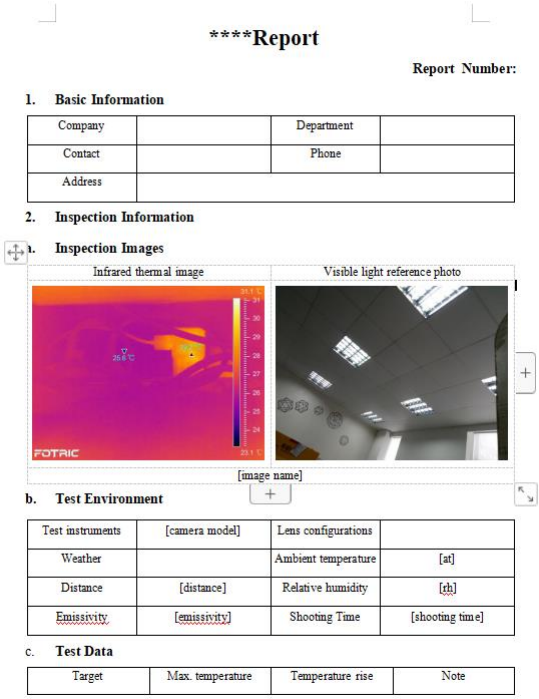
- The ‘search’ function is useful for screening data. For example, the command ‘s_marker_gt_30’ will only display data whose value is greater than 30.
- In addition, AnalyzIR allows users to operate simple calculation based on measurement results and pre-set parameters. For example, ‘marker_maxT_add_irfile_at’ means adding the maximum temperature on measurement tool to the ambient temperature.

2. Bookmarks adding & editing 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

a. 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]
Emissivity	[emissivity]	Shooting Time	[shooting time]

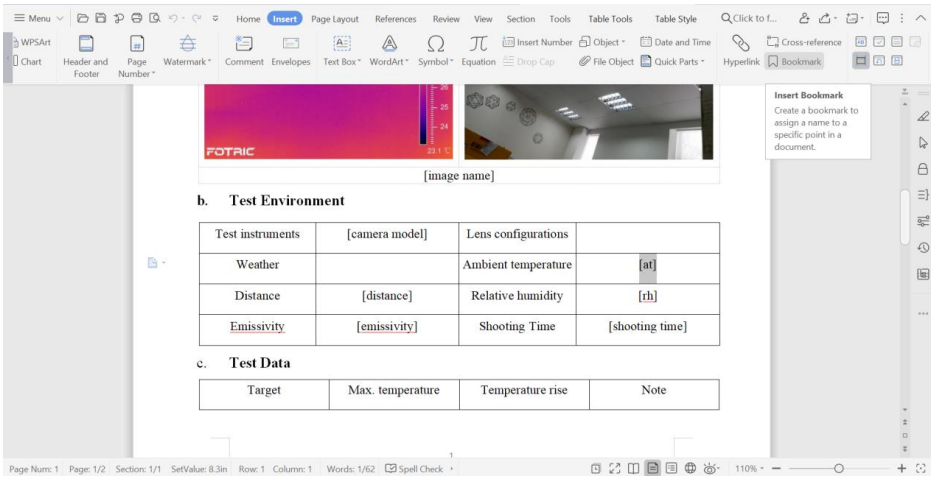
c. Test Data

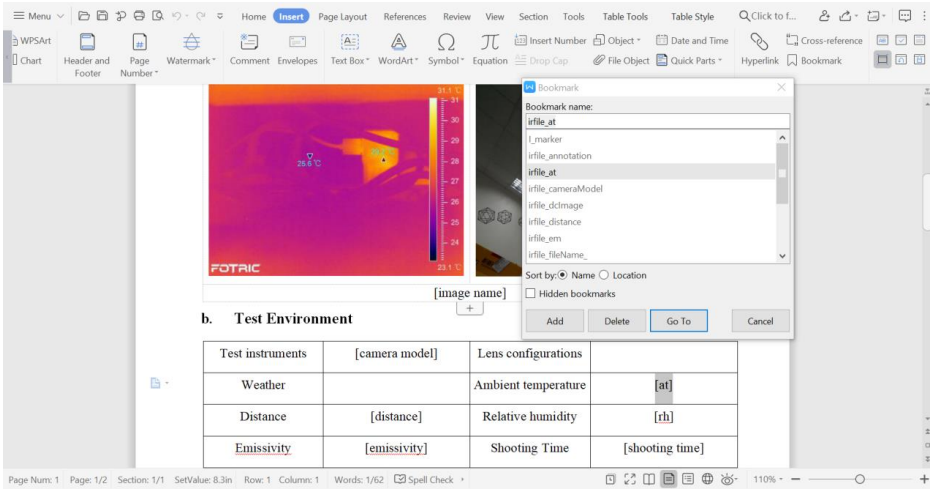
Target	Max. temperature	Temperature rise	Note

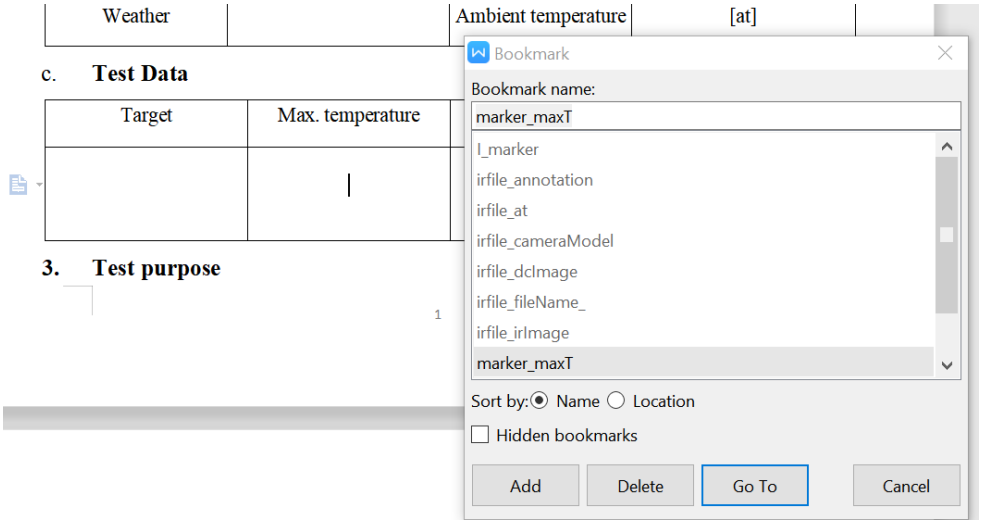
2) Add bookmarks in the table's result cells.

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:

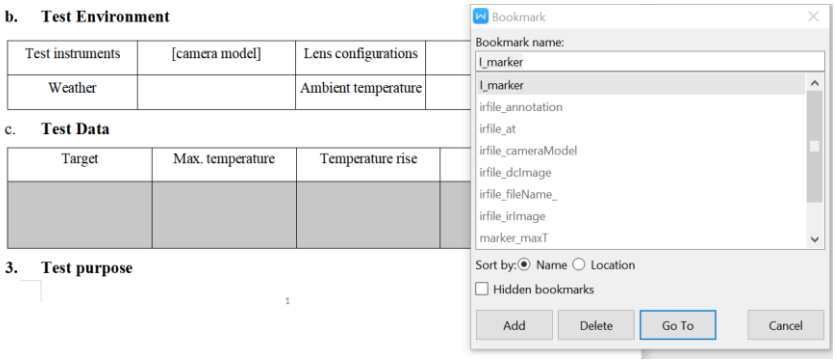

Insert Bookmark
Create a bookmark to assign a name to a specific point in a document.
[image name]
b. Test Environment
Test instruments | [camera model] | Lens configurations |
Weather | | Ambient temperature | [at]
Distance | [distance] | Relative humidity | [rh]
Emissivity | [emissivity] | Shooting Time | [shooting time]
c. Test Data
Target | Max. temperature | Temperature rise | Note


Bookmark
Bookmark name:
irfile_at
t_marker
irfile_annotation
irfile_at
irfile_cameraModel
irfile_dcImage
irfile_distance
irfile_em
irfile_fileName_
Sort by: Name Location
Hidden bookmarks
Add
Delete
Go To
Cancel
[image name]
b. Test Environment
Test instruments | [camera model] | Lens configurations |
Weather | | Ambient temperature | [at]
Distance | [distance] | Relative humidity | [rh]
Emissivity | [emissivity] | Shooting Time | [shooting time]

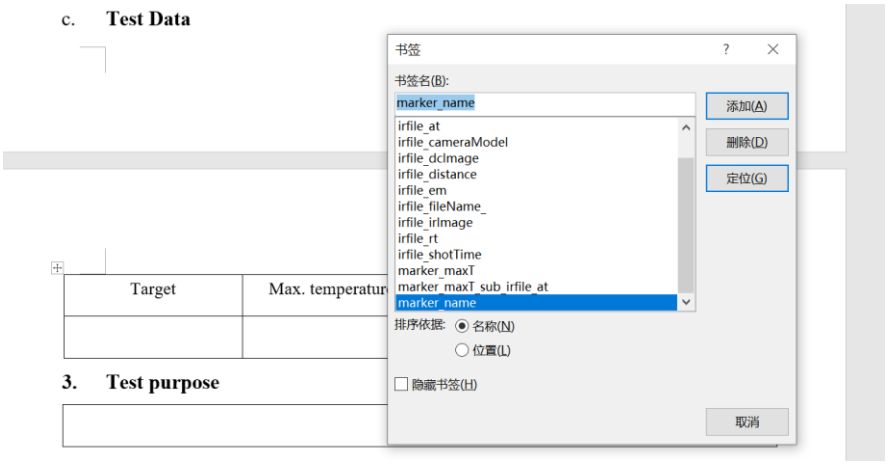


3) When use “I_marker”(in loop),

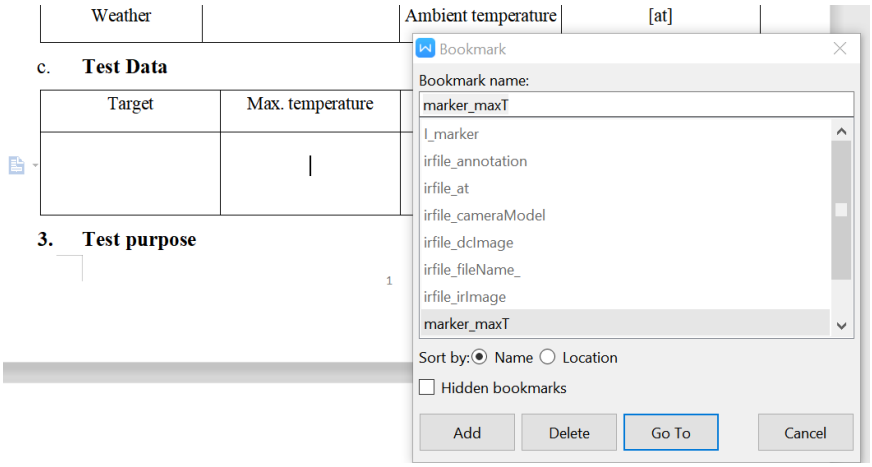
Please first choose the whole row, like below

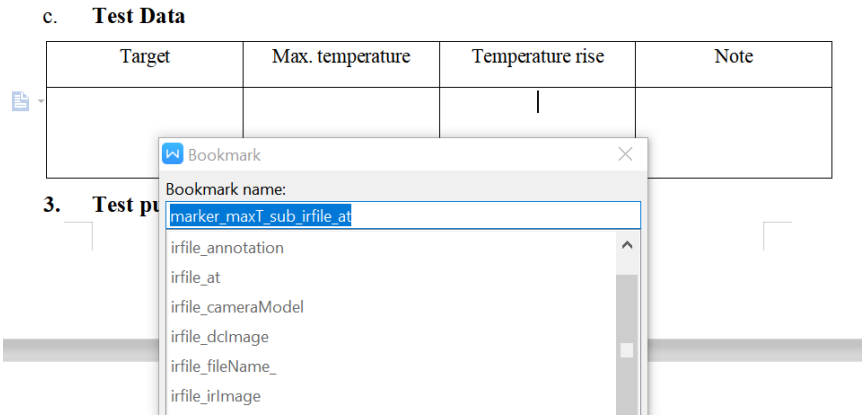


Secondly, choose the first cell, click “bookmarks”, input marker_name:



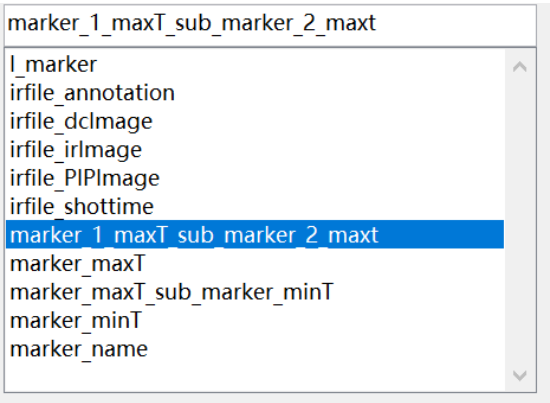
Thirdly, choose other cells, click “bookmarks:, input marker_maxT, and so on..





4) If not use “loop”, please insert bookmarks: “ marker_1_maxT”, “marker_2_maxT” in the form. The orders of the numbers are the orders when you add the measurement tools.

   For example, if need to calculate the difference between first and second measurement tools’ max temperatures, insert bookmark “marker_1_maxT_sub_marker_2_maxT”



5) After complete set all the bookmarks in the report template, save the word file to make it a template

   Note: the layer of commands must be connected with an underscore sign ‘_’