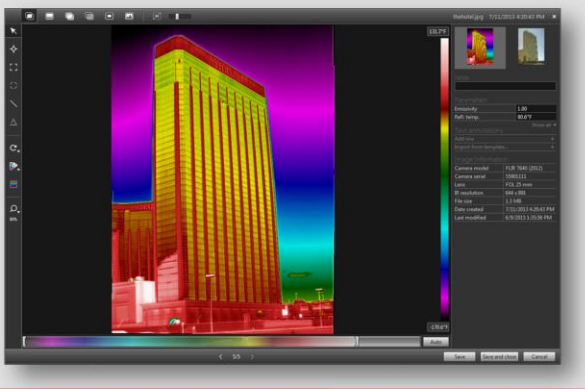
INFRARED TRAINING CENTER

FLIR Tools +

Advanced PC software for creating Microsoft Word templates and reports, panoramas, and sequence recordings.



1

What is FLIR Tools?

FLIR Tools is a versatile software suite for importing and analyzing images and creating inspection reports.

- Import images, videos, and CSQ files from FLIR cameras.
- Analyze IR images and save changes.
- Adjust object parameters globally and locally.
- Create text annotation templates.
- Create and save inspection reports and export to PDF.
- View live radiometric video and save JPEGs.
- Play and analyze SEQ and CSQ files.
- Create temporal plots from measurement results.

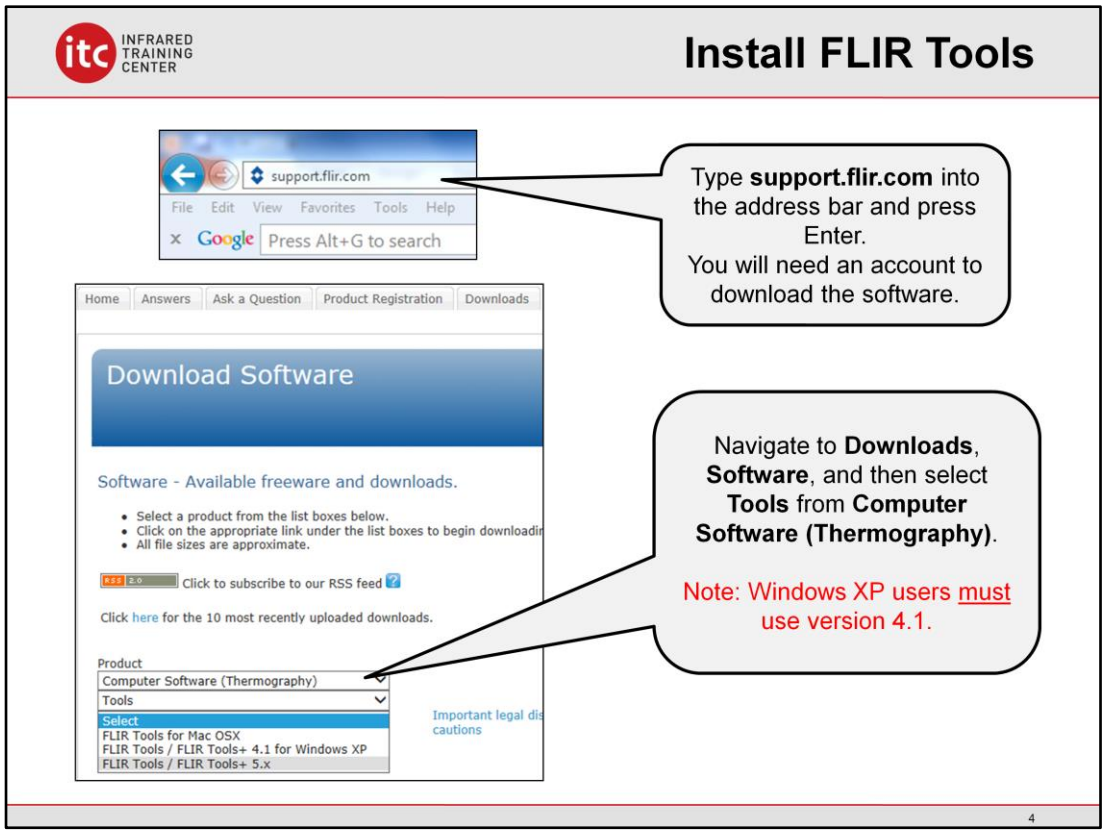
2

What is FLIR Tools+?

The FLIR Tools+ License Adds:

- Panorama stitching.
- SEQ recording (real-time and interval) and playback.
- Word Reporting using the FLIR add-in.
  - Create custom templates and Word reports.
  - Save documents for post-processing at a later time as a Word document.

3



FLIR Tools can be downloaded from the FLIR Support Center website. A user account is needed to download software and manuals.

FLIR Tools + Activation

- Incorporated in the same download as FLIR Tools.
- To enable the features a purchased licensed is required, or a 30 day trial can be used to temporarily activate the software.
- The Word Add-in requires a 32-bit edition of MS-Office 2007, 2010, or 2013.
  - If using Office 365 Word must be installed locally on the PC. The “cloud-only” version does not support add-ins.

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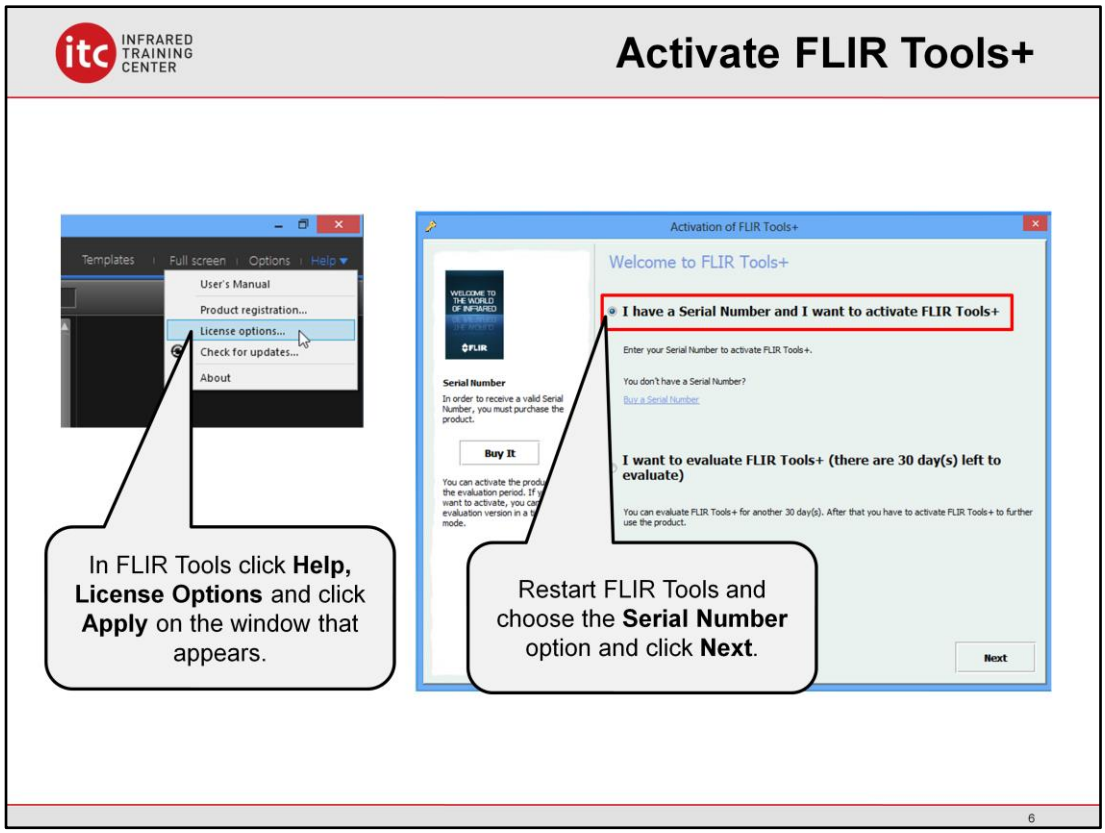

FLIR Tools+ can be activated from FLIR Tools, no additional software needs to be downloaded. From FLIR Tools click **Help**, **License Options**, and click **Apply**. Now close and re-start FLIR Tools. A new window will appear with two options:

1. If you have a serial number select the option “I have a Serial Number….” and click Next to activate online.

2. If you want to try for 30-days chose the “I want to evaluate…” option and click Next. This is a fully functional version of FLIR Tools+ that will expire in 30-days unless activated.

Objectives

- Create a Panorama image.
- Record sequences.
- Create a new Microsoft Word template:
  - Page layout tips that will help with the design process.
  - Use FLIR Tools+ objects such as the IR and DC Viewer, Tables, and Fields.
  - Add a Cover Page and Summary Page.
- Send selected images to a new Word report.

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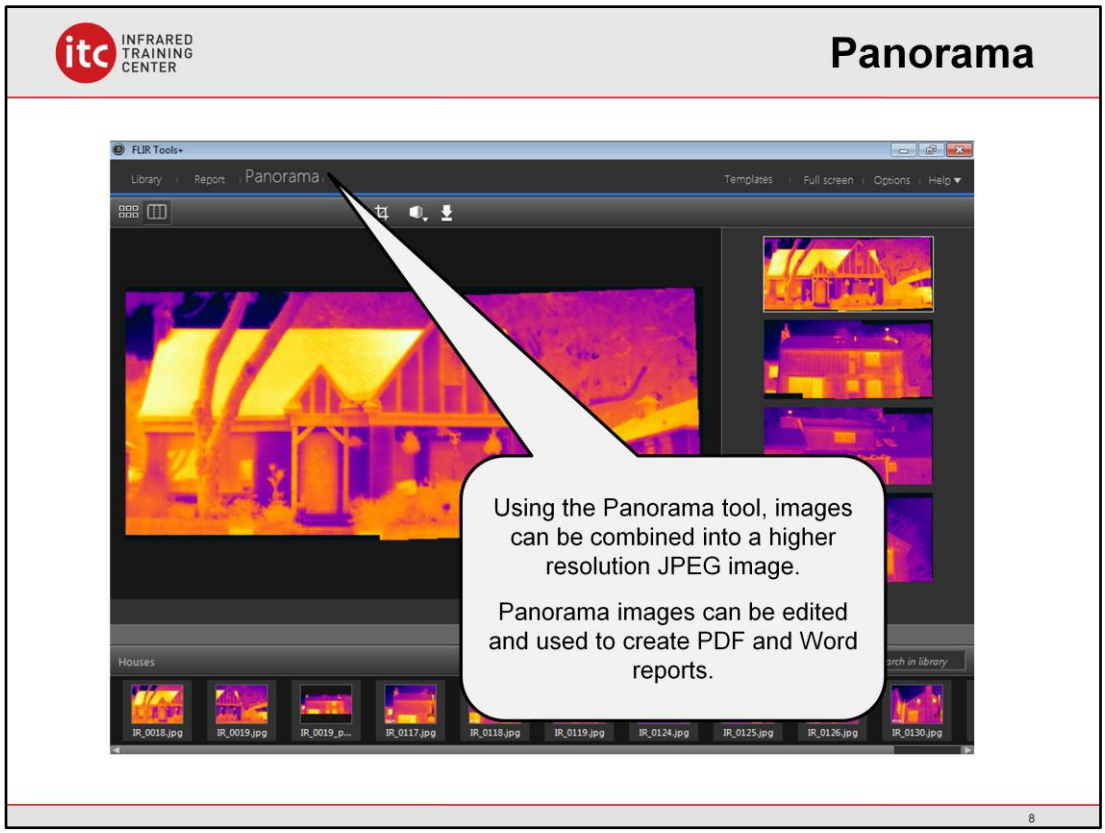
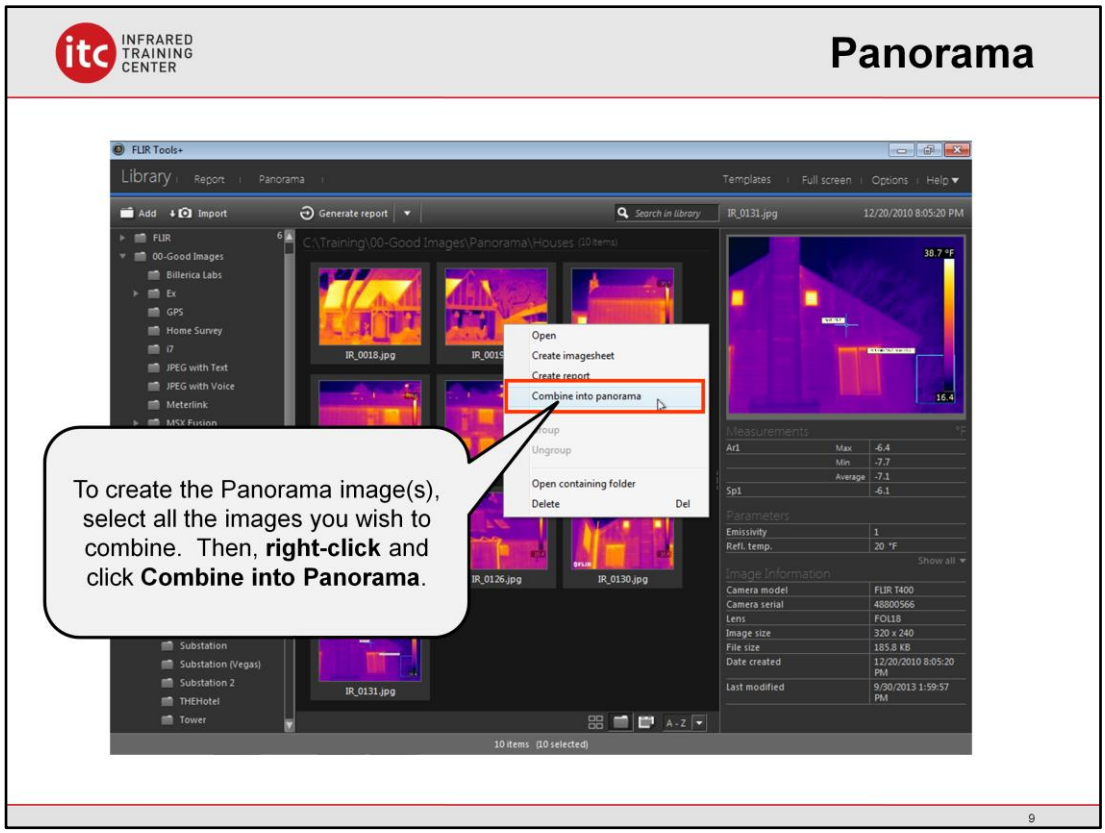


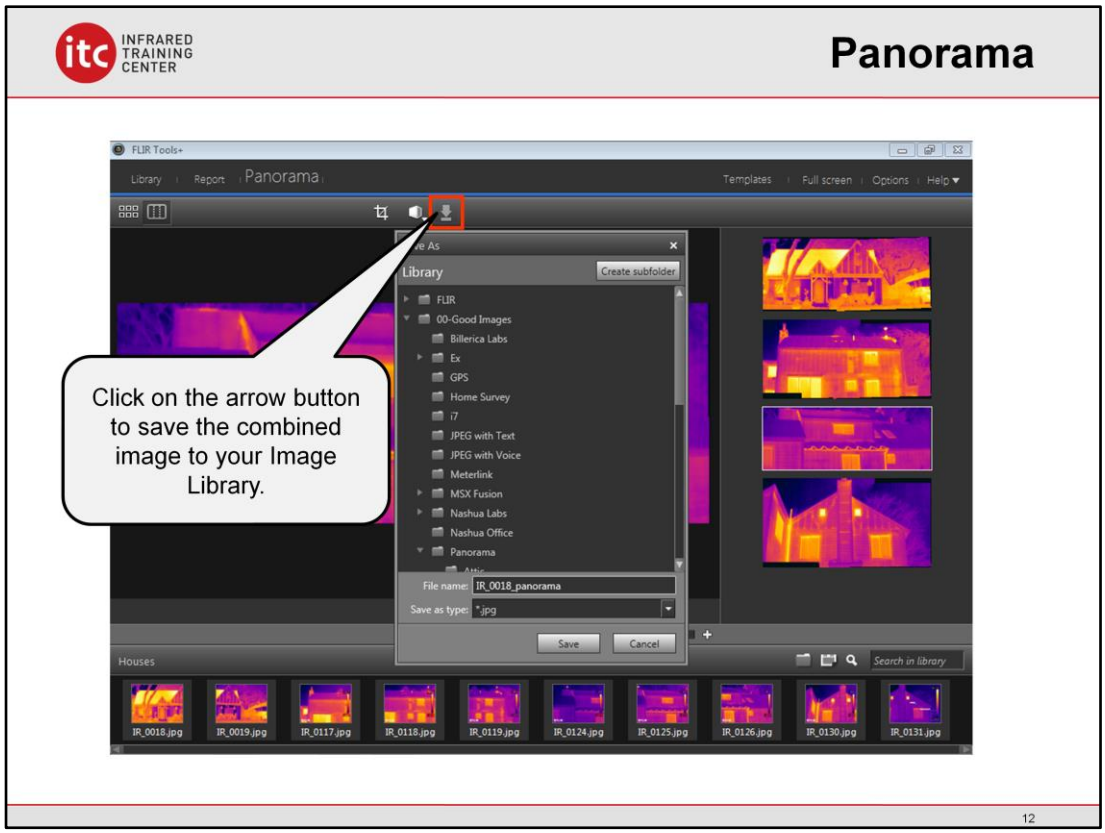
The **Panorama Tool** allows you to combine several radiometric JPEG images into a single, high-resolution JPEG image. The resulting image can be saved and used in FLIR Tools reports (REPX) and Microsoft Word reports.



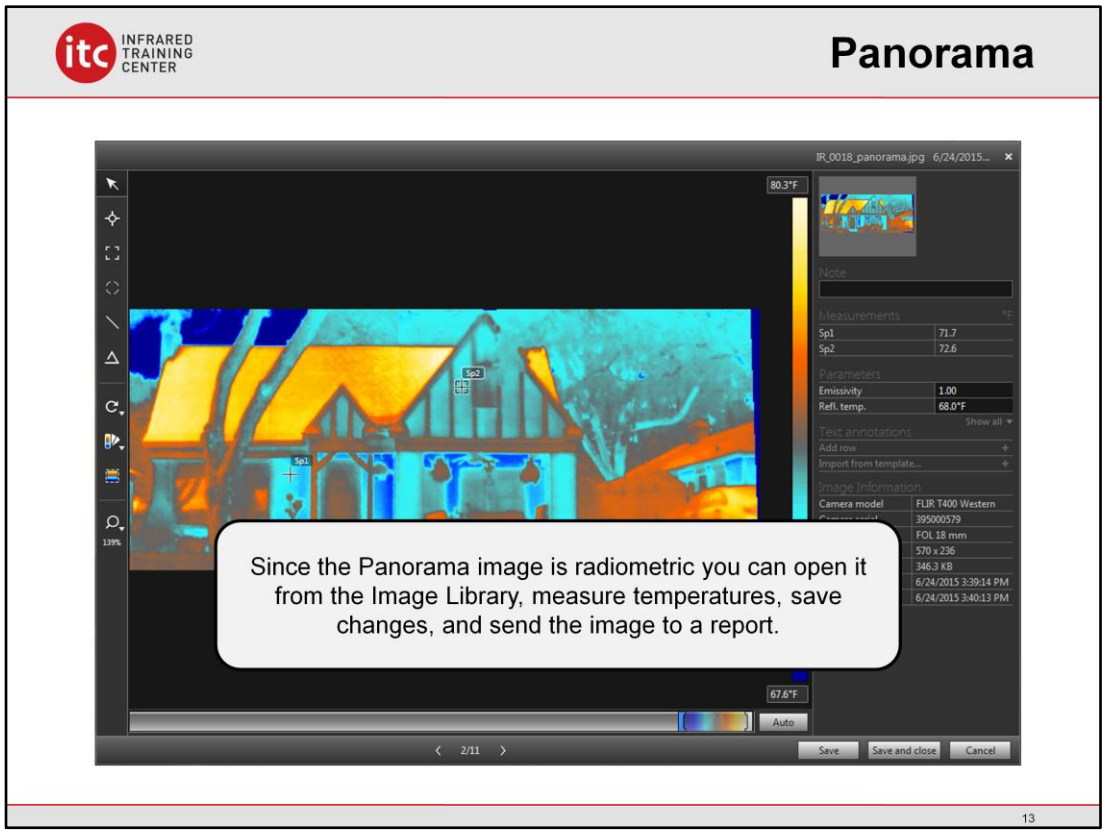
The process of creating the Panorama image starts in the Image Library. First, find and select the images you wish to combine. You can use the CTRL key or SHIFT key on the keyboard to select multiple images. Right-click on one of the selected images and click **Combine into Panorama**.

The software will automatically detect matching images and combine them into a Panorama. If multiple Panorama's exist, the software will sort out which images go together and create more than one image. In this example four Panorama images were created from the selected images.

Panorama images can be cropped to remove some of the jagged edges that can occur. Some perspective adjustments can also be made.



The arrow button can be used to save the panorama image to the library.



Panorama images created using Tools+ retain all of the temperature information, allowing you to process the images, measure temperatures and create inspection reports.

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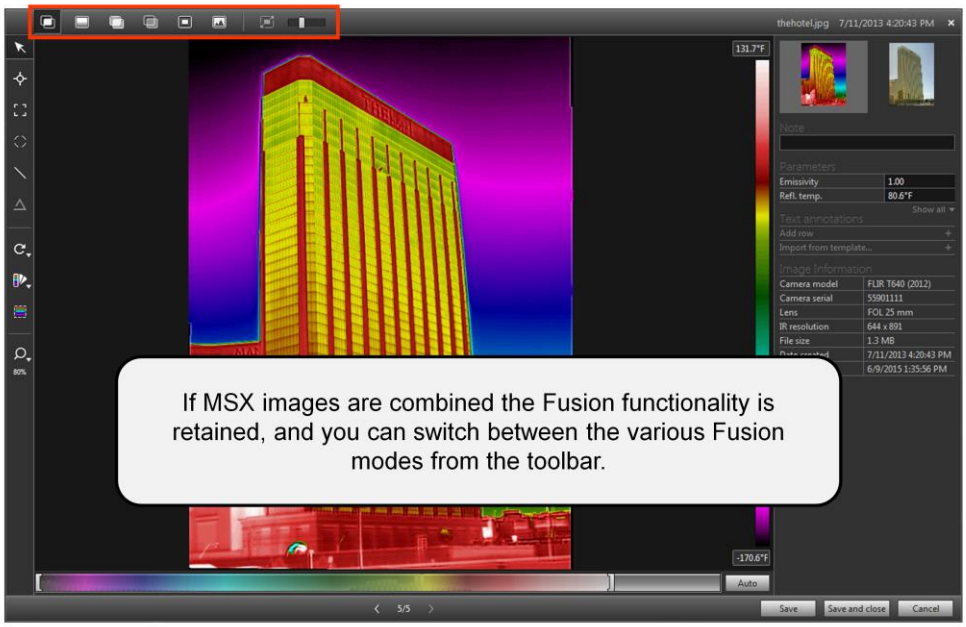
Panorama



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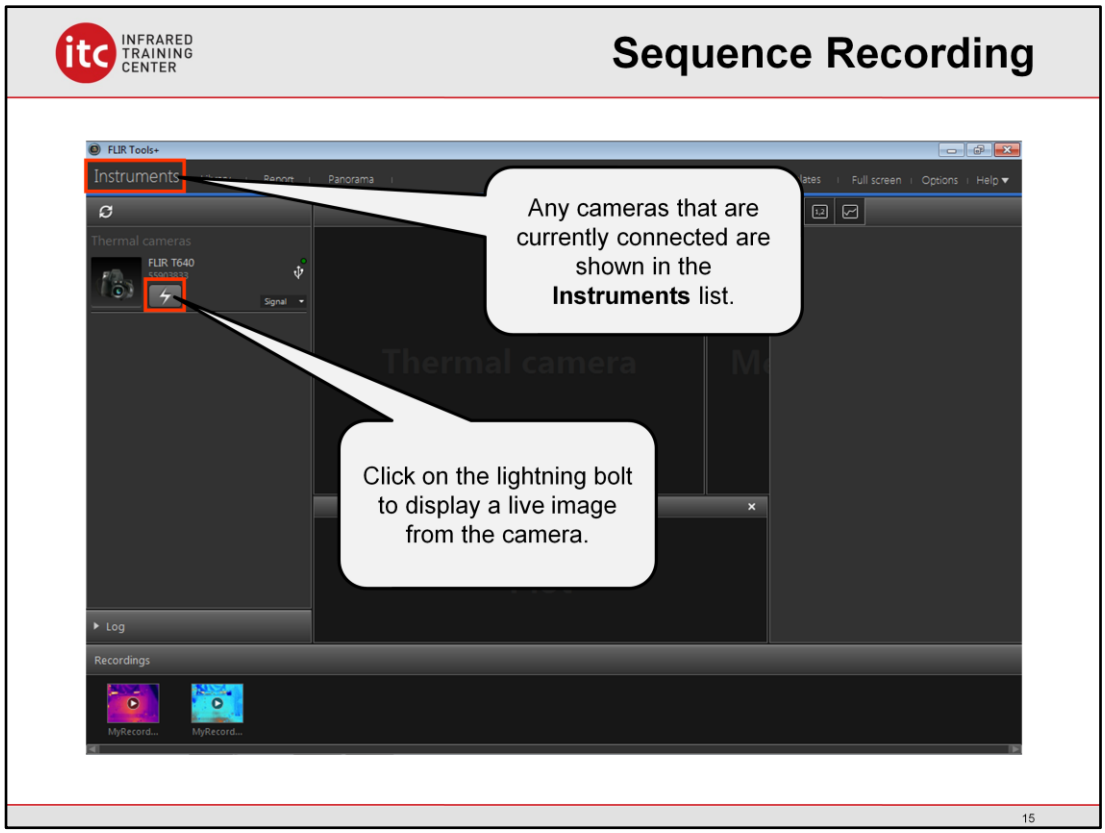
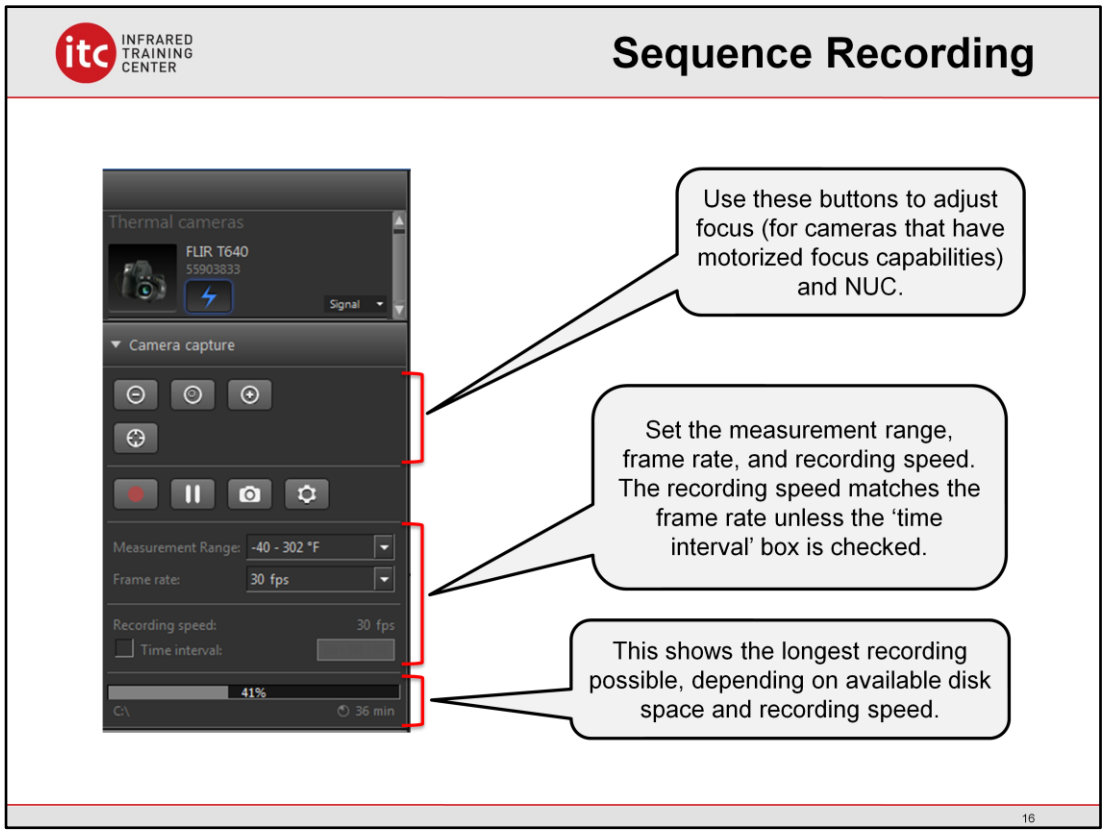


FLIR Tools+ can record radiometric sequences from compatible USB and Ethernet cameras. You can also control the focus, change range, and measure temperatures on the live image. Any cameras that are currently connected can be seen in the Instruments list.

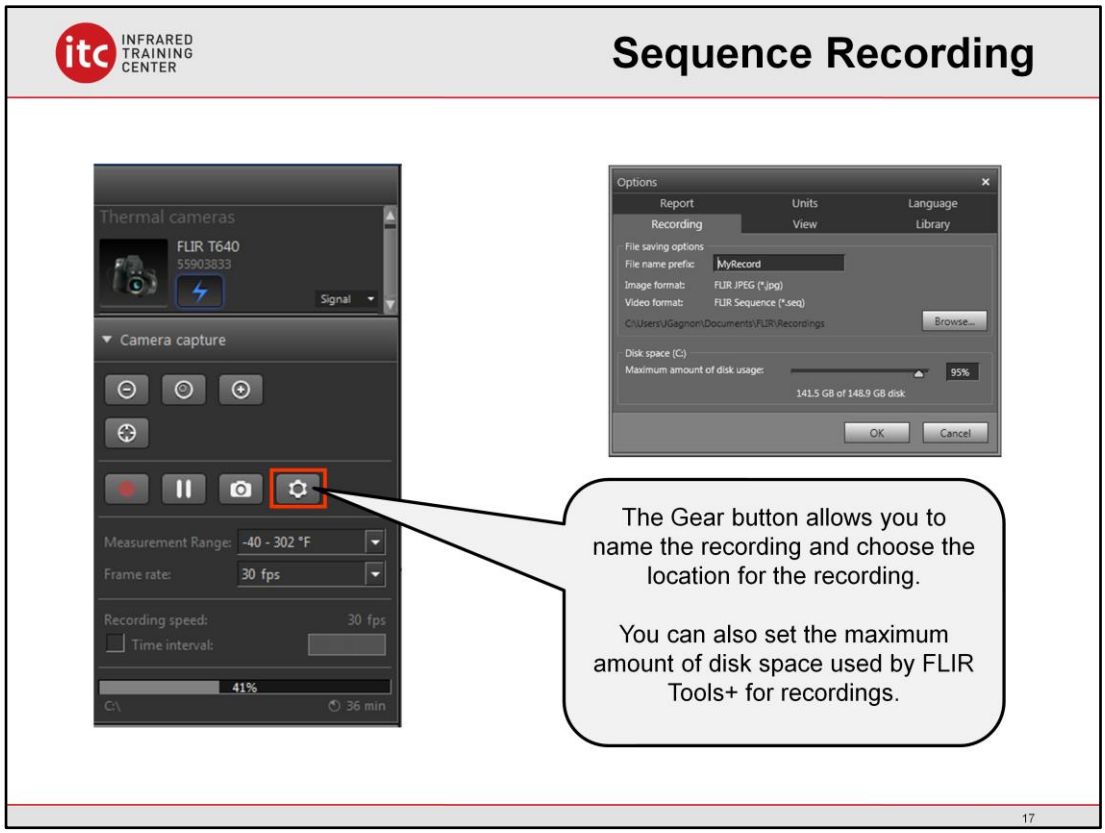
Click the lightning bolt button to display a live image.



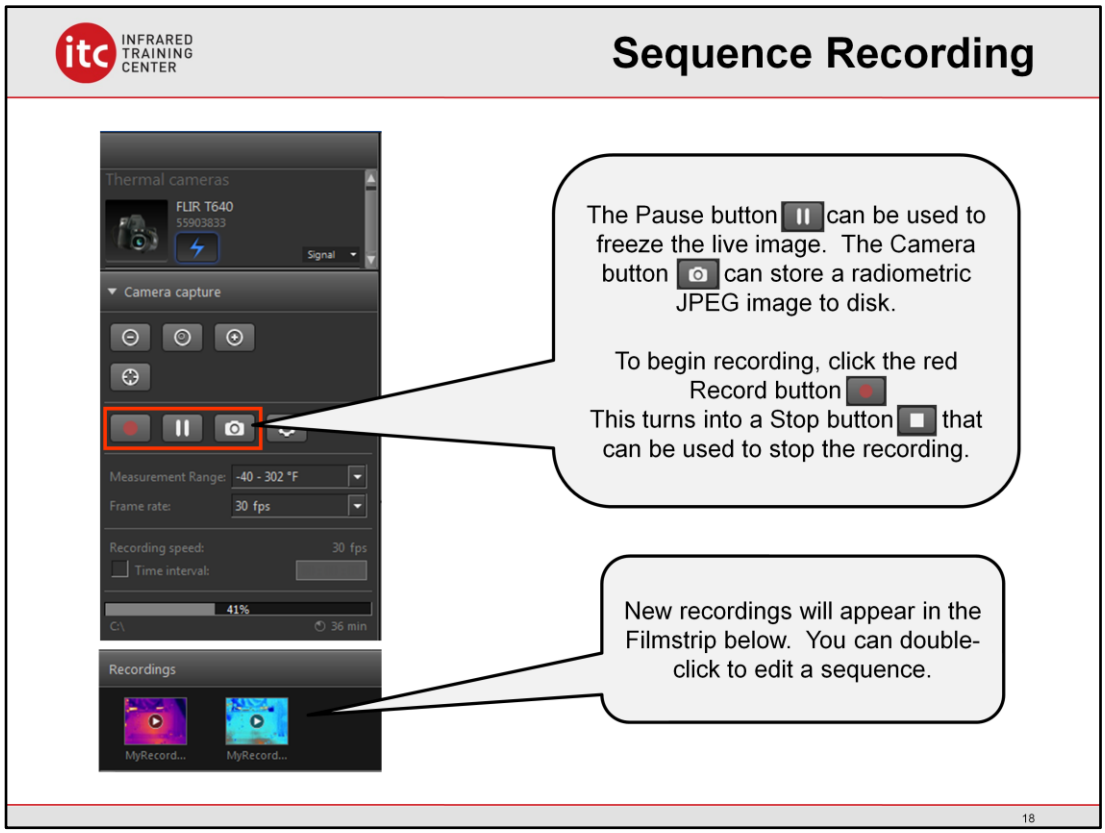
Most of the camera control functions are the same as with FLIR Tools. If the camera has electronic focus you can adjust the near/far focus, and you can auto-focus. You can also perform a NUC, which is a good idea before a recording is started.

The measurement range can be changed, the range limits depend on the camera model. You can also adjust the frame rate for certain cameras.

By default the recording will be at the selected frame rate, however this can be reduced using the 'time interval' checkbox. For example, you can choose to record one image every second. This can save disk space in cases where the highest frame rate is not needed. The total duration of the recording (based on available disk space and recording speed) is shown at the bottom of the window.



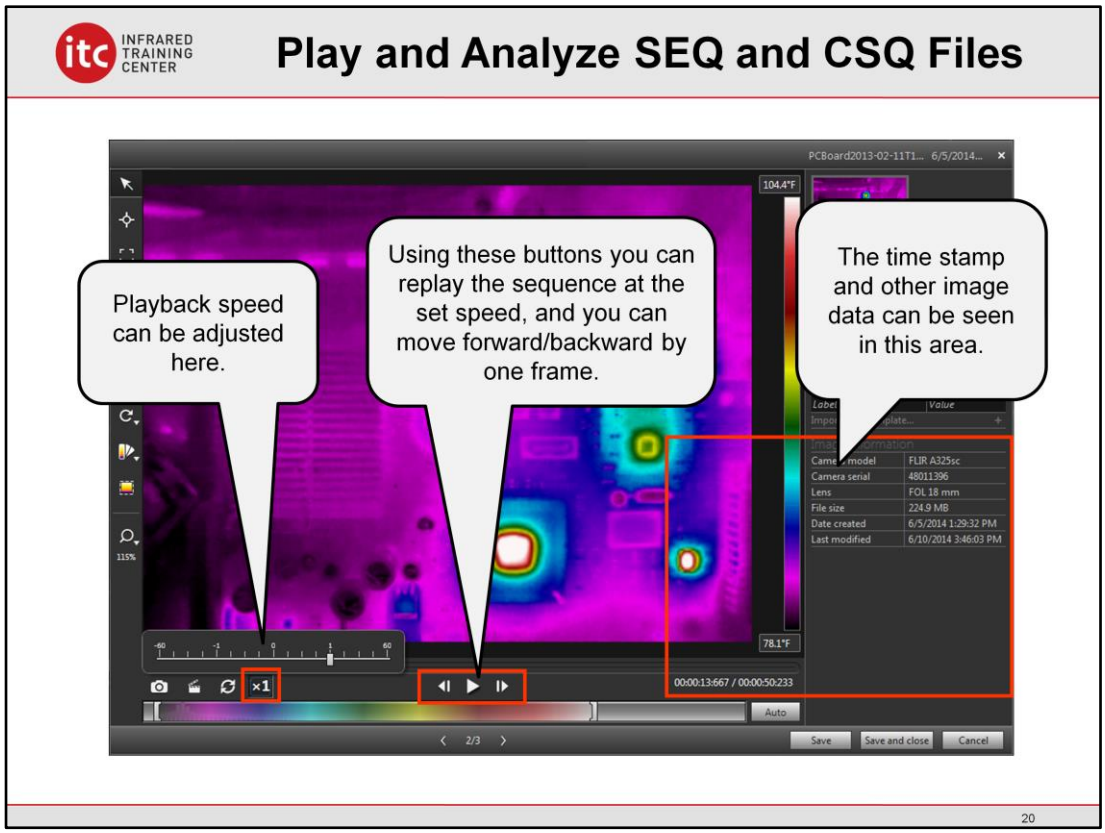
The gear button allows you to set the name of the recording and also select a location. The default location is \My Documents\FLIR\Recordings.



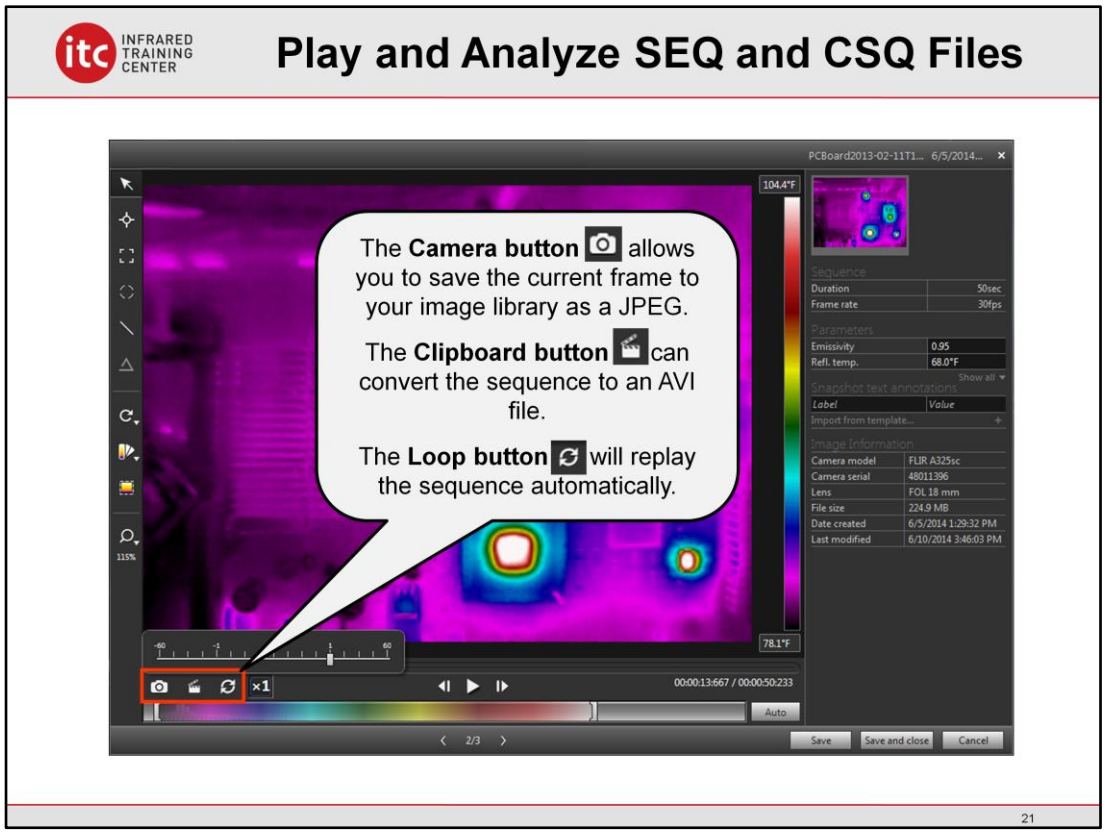
The record button is enabled with Tools+. This begins the recording at the selected frame rate or time interval. This turns into a stop button which can be used to stop the recording.

Once the SEQ is recorded to disk you can double-click on it to open the video. FLIR Tools and Tools+ can process SEQ and CSQ recordings.

As with any standard radiometric JPEG, you can easily measure temperatures, adjust the thermal tuning, change emissivity and other parameters, and add text annotations to the sequence. All of these changes can be saved with the recording.



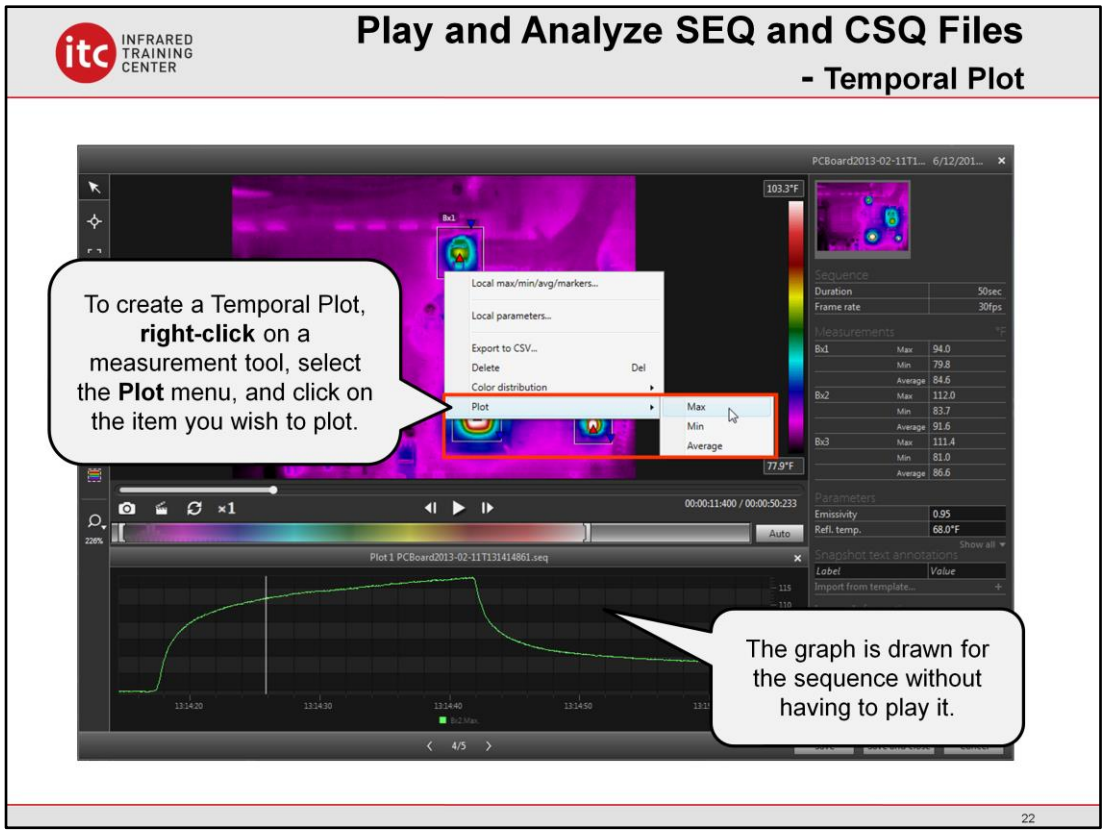
If you click the **x1 button** the playback speed can be adjusted to play forward or backward up to 60x times the original speed. The play buttons in the center of the toolbar will play the recording, and you can step forward/backward by one frame. The camera type, date, time, and other data shows in the panel to the right of the image.



The camera button below the image allows you to extract any frame from the recording to your image library as a radiometric JPEG. This can be analyzed using FLIR Tools and can be used in a report.

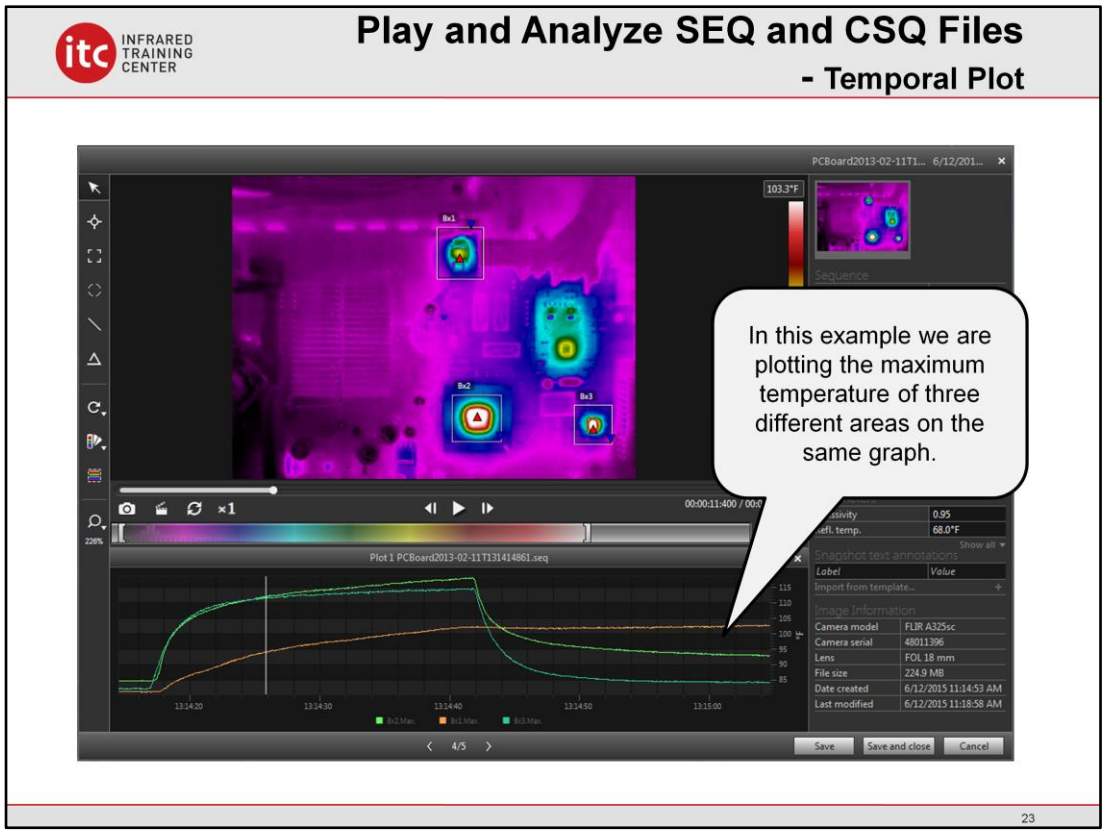
You can also convert the sequence to an AVI file, which is handy for sharing with others who do not have the FLIR software.

The loop button will automatically replay the sequence.



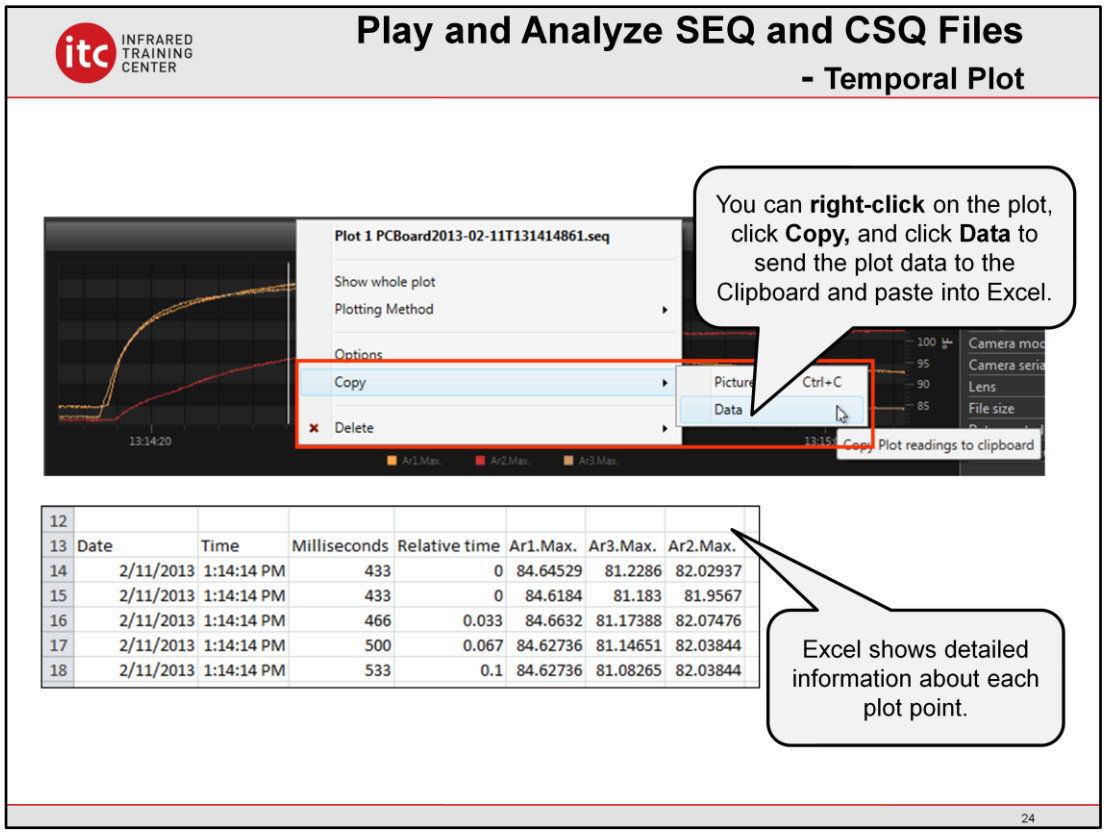
Temporal Plots can be a convenient way to analyze transient events.

Plots can be created using any measurement tool. Just **right-click** on the tool, click **Plot**, and then click the item you wish to plot. In this case we are plotting the maximum temperature of Area 1. The graph is drawn automatically without having to replay the entire sequence.



More than one tool can be plotted on the same graph. To add more tools simply right-click on the next tool and choose the Plot menu again. Repeat this process for each tool you wish to plot.

This graph is plotting the maximum temperature of three different areas.

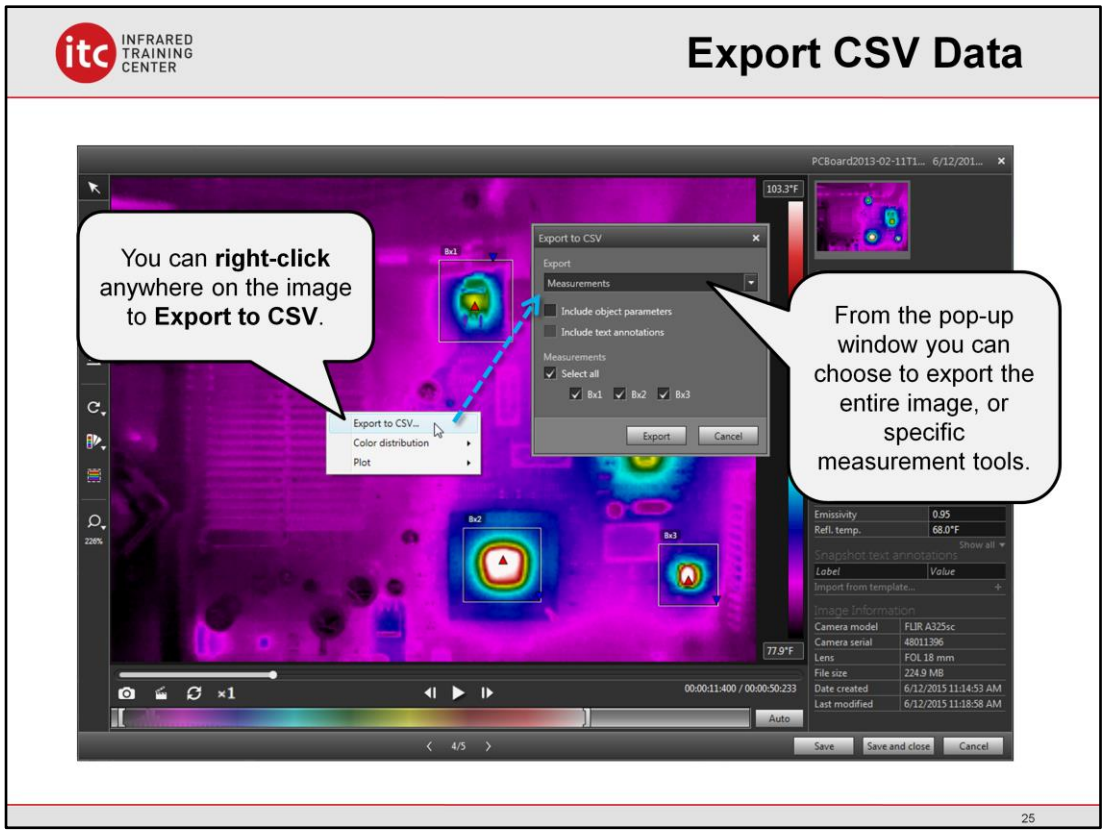


	Date	Time	Milliseconds	Relative time	Ar1.Max.	Ar3.Max.	Ar2.Max.
14	2/11/2013	1:14:14 PM	433	0	84.64529	81.2286	82.02937
15	2/11/2013	1:14:14 PM	433	0	84.6184	81.183	81.9567
16	2/11/2013	1:14:14 PM	466	0.033	84.6632	81.17388	82.07476
17	2/11/2013	1:14:14 PM	500	0.067	84.62736	81.14651	82.03844
18	2/11/2013	1:14:14 PM	533	0.1	84.62736	81.08265	82.03844

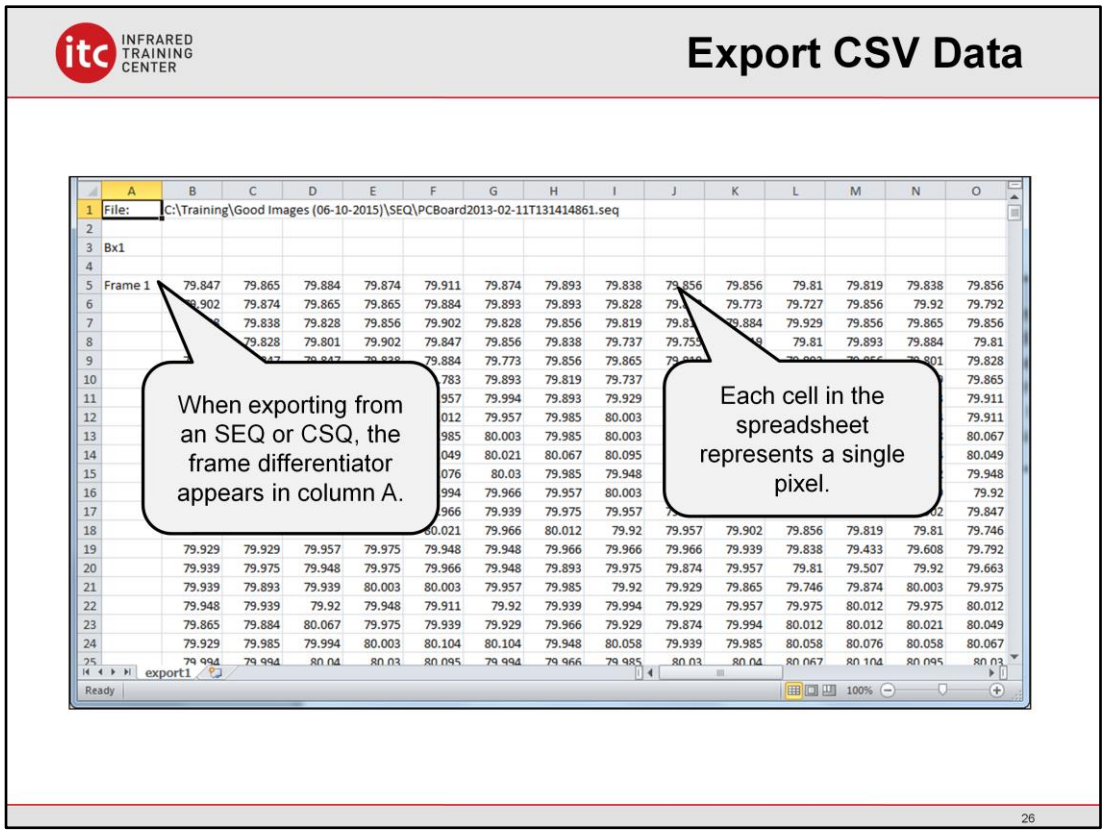
Plot data can be easily copied from FLIR Tools as text and pasted into other programs like Microsoft Excel for more detailed analysis.

Just **right-click** anywhere on the graph, click **Copy**, and click **Data** to copy the plot data to the Windows Clipboard. Now you can start Excel and paste the data into a new spreadsheet.

Each row represents a plot point in the graph. The data is broken up into columns showing the date, time, and temperature for each measurement tool.

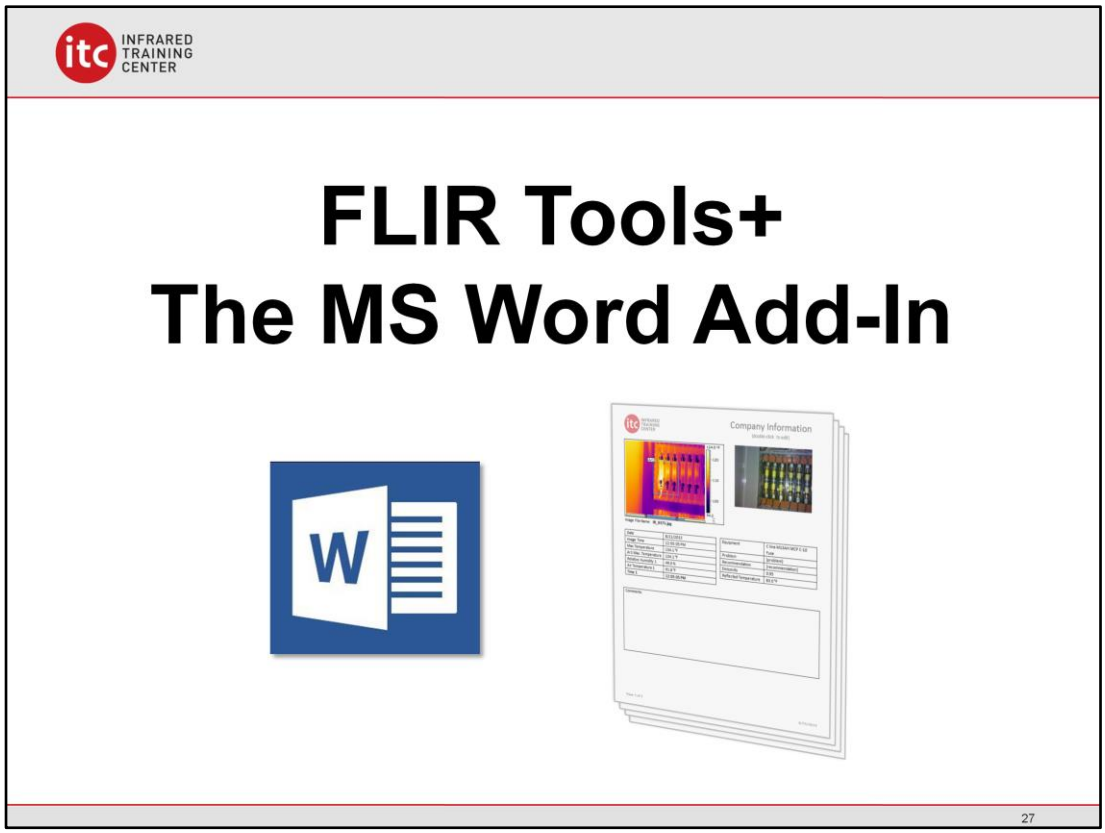


Temperature data for an image, or for any measurement tool, can be exported to **CSV format**. This is a comma-separated text file that can be read using Excel.



When exporting an image, area, or line, the text file will contain an array of temperatures for each pixel.

When exporting from an SEQ or CSQ, each frame from the recording is exported to a single CSV file. Column A contains the frame differentiator.



The Microsoft Word add-in expands the reporting capabilities by allowing you to create custom Word templates.

Tools+ Add-In

Use the Word Tools+ Add-In to automate the report generation and:

- Conduct the *Same* analysis on each image in the report.
- Use a consistent color palette through out the report.
- Multiple Logos.
- “Customize” the report with customer specific information from the same template.

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Tools+ Add-In

- Use formulas for complex analysis such as severity determination.
- Automatically generate a summary table of the “findings” within the report.
- Create “fused” images (PnP, Fusion, MSX) from individual Infrared and Visual (Digital) sources.

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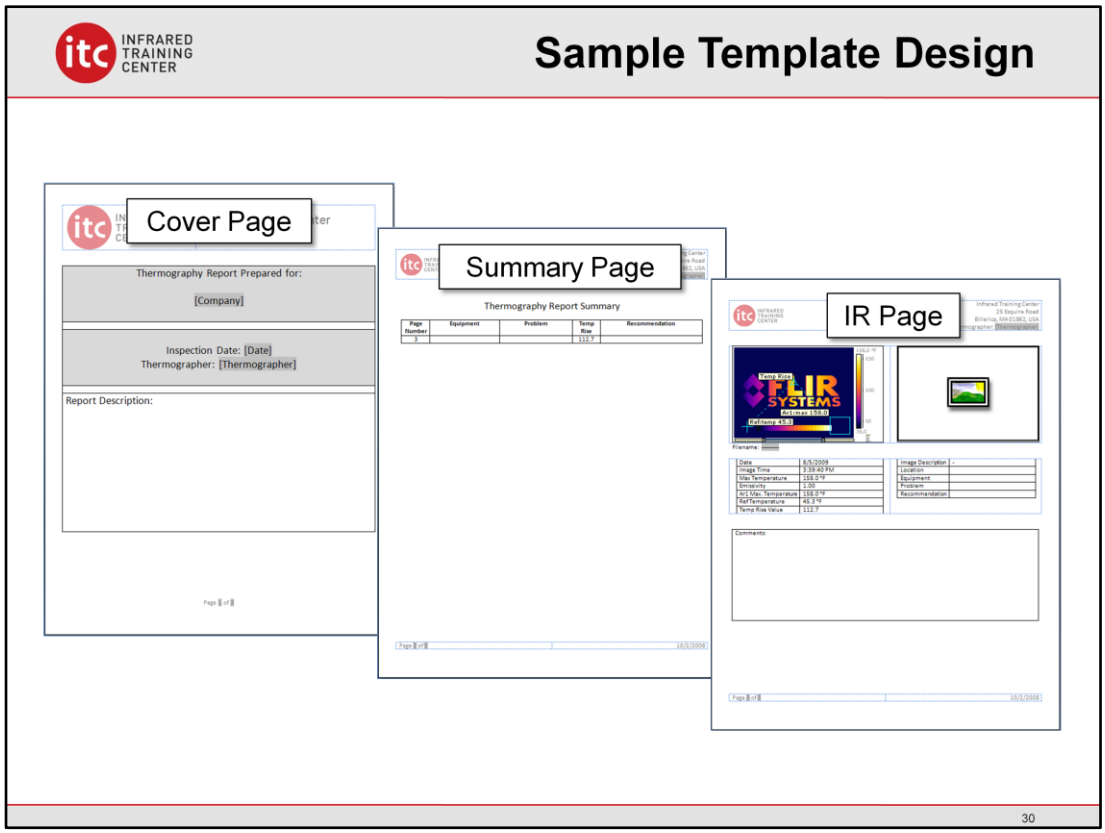
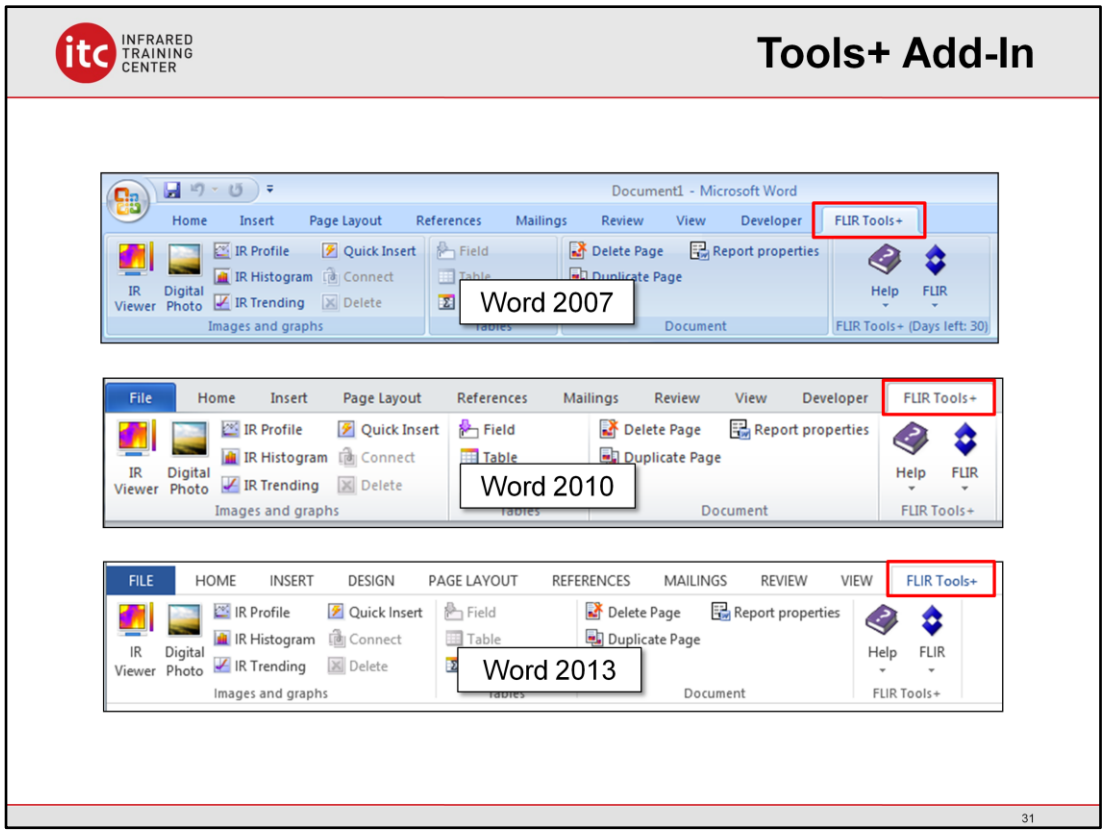
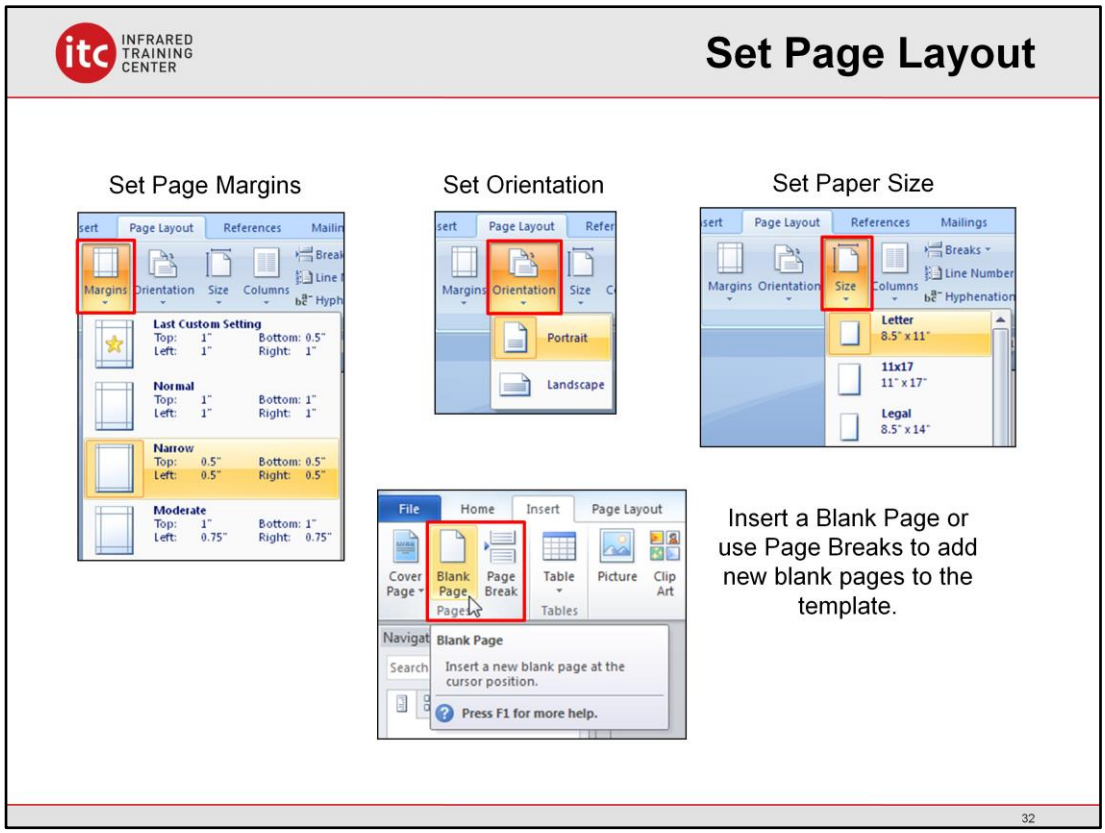


This tutorial will guide you through the process of designing a new template consisting of:

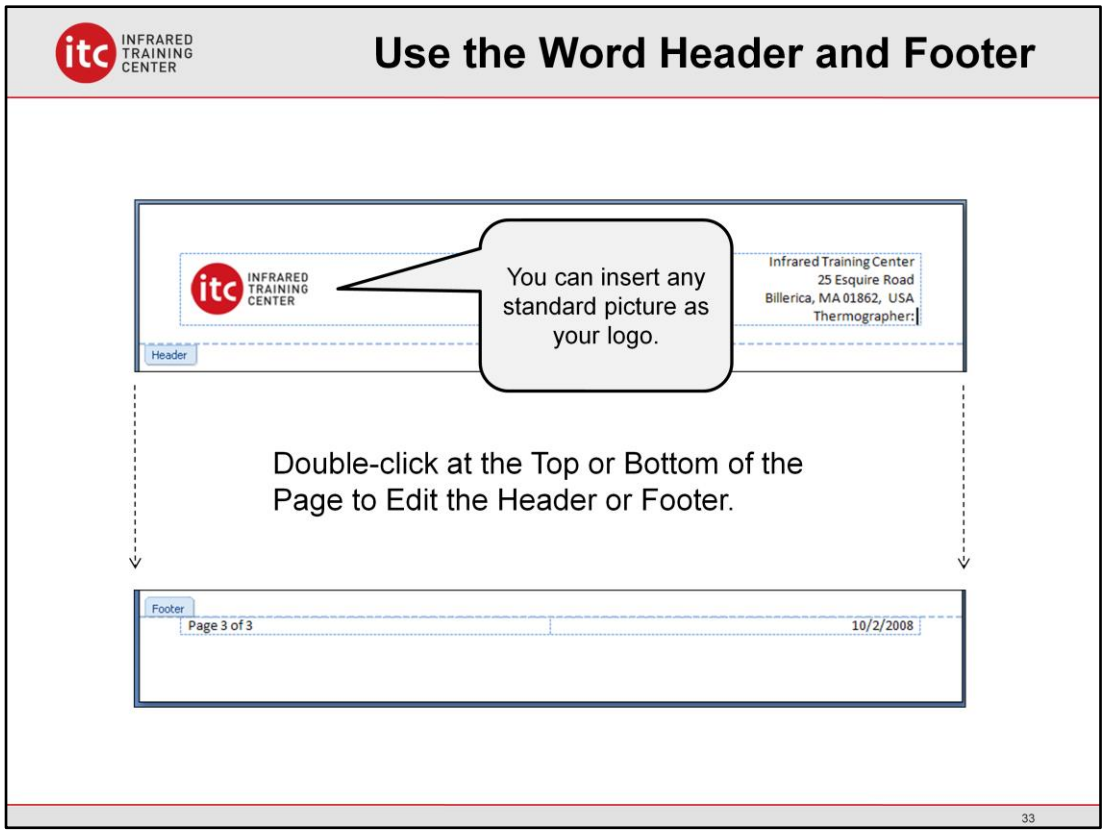
A page with an IR and Photo placeholder.
A page with a Summary table.
A cover page with Document Properties.



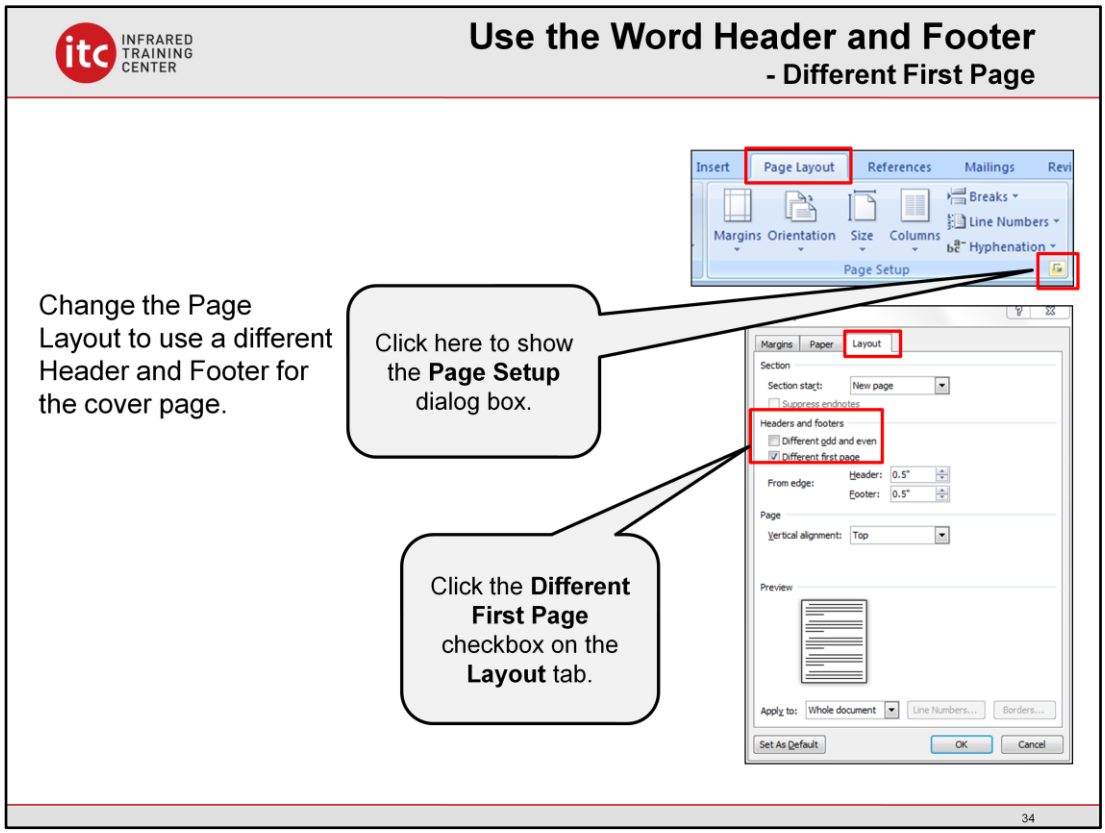
The FLIR Tools+ add-in appears as a tab in Microsoft Word. This tab is always present in Word unless you uninstall or de-activate Tools+.



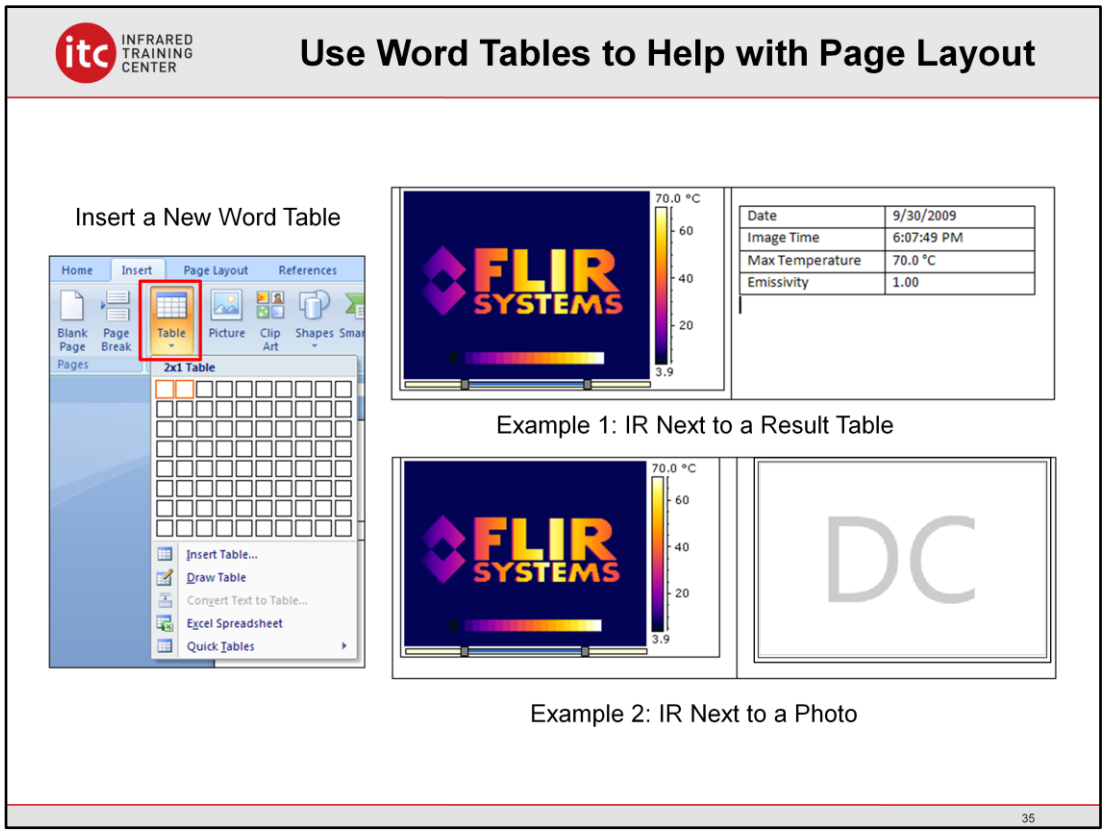
It is best to set the page layout, size and margins before beginning the design process. If you need to insert extra pages insert a blank page, or insert a page break.



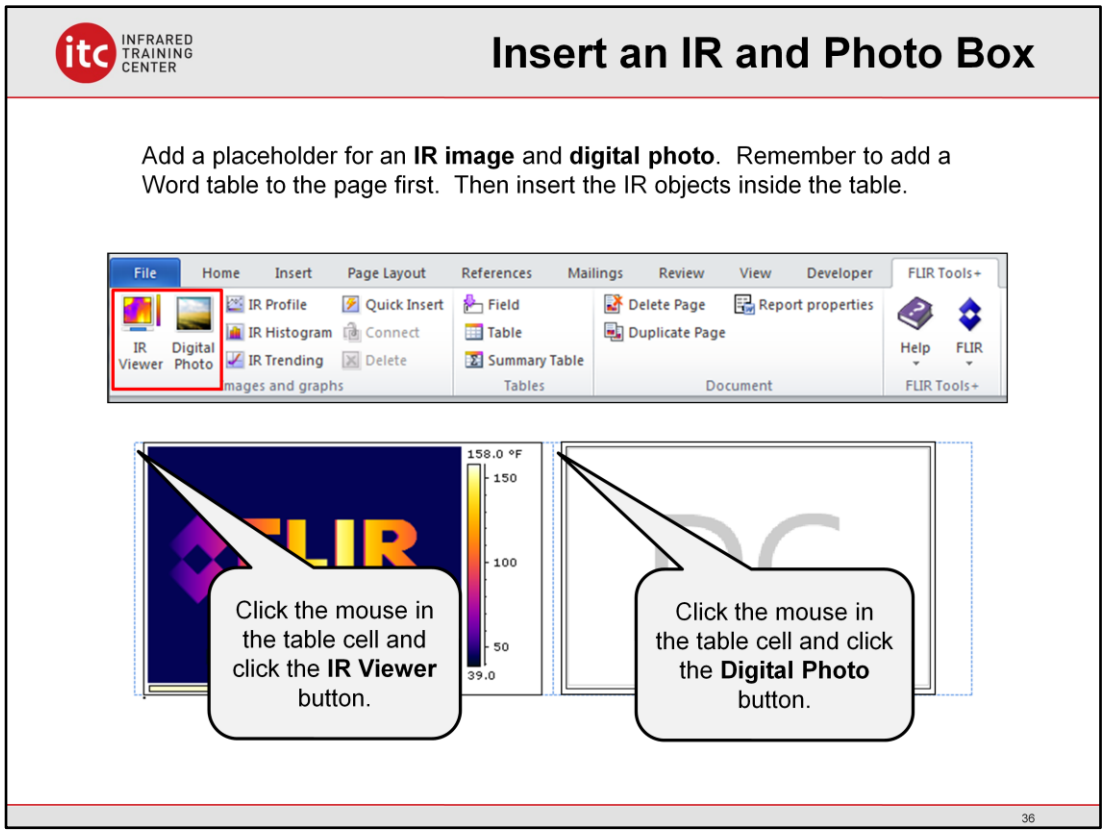
The Word header and footer are ideal for displaying information that you would like to show on all pages. By utilizing the header and footer space you reserve more page space for IR data, tables, and text boxes.



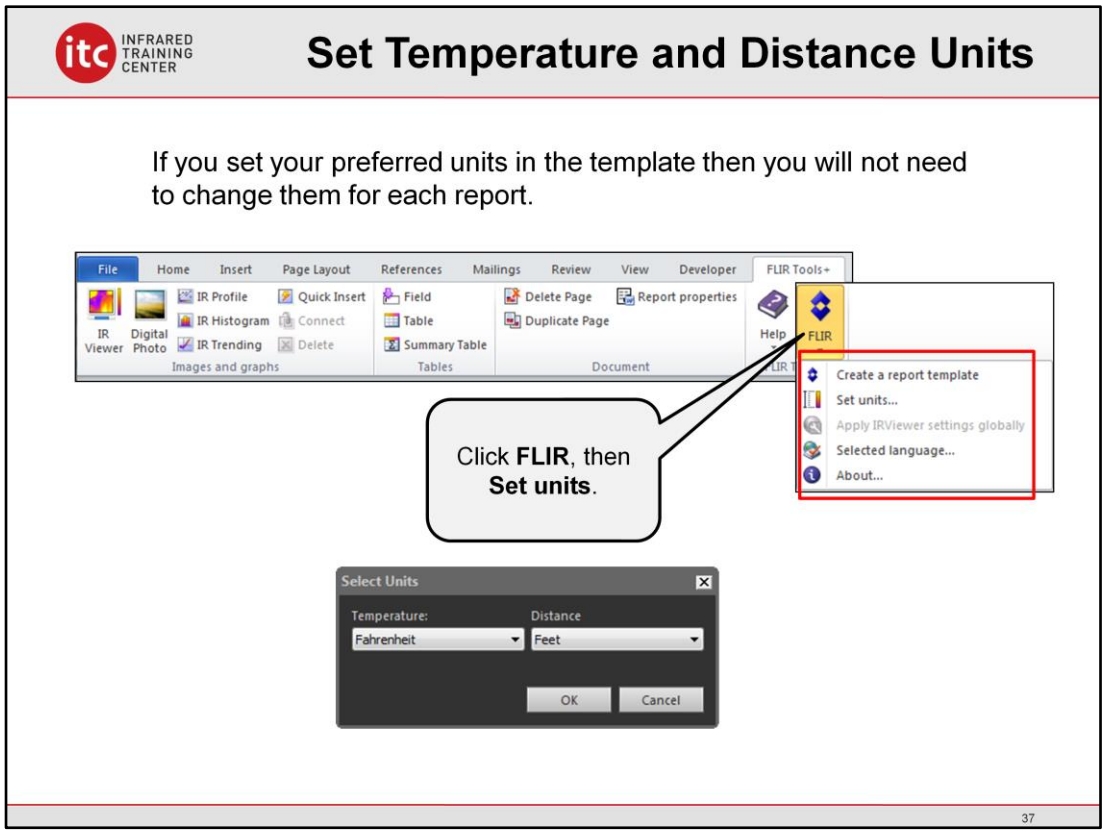
If needed you can alter the page layout to display a different header and footer on the cover page.



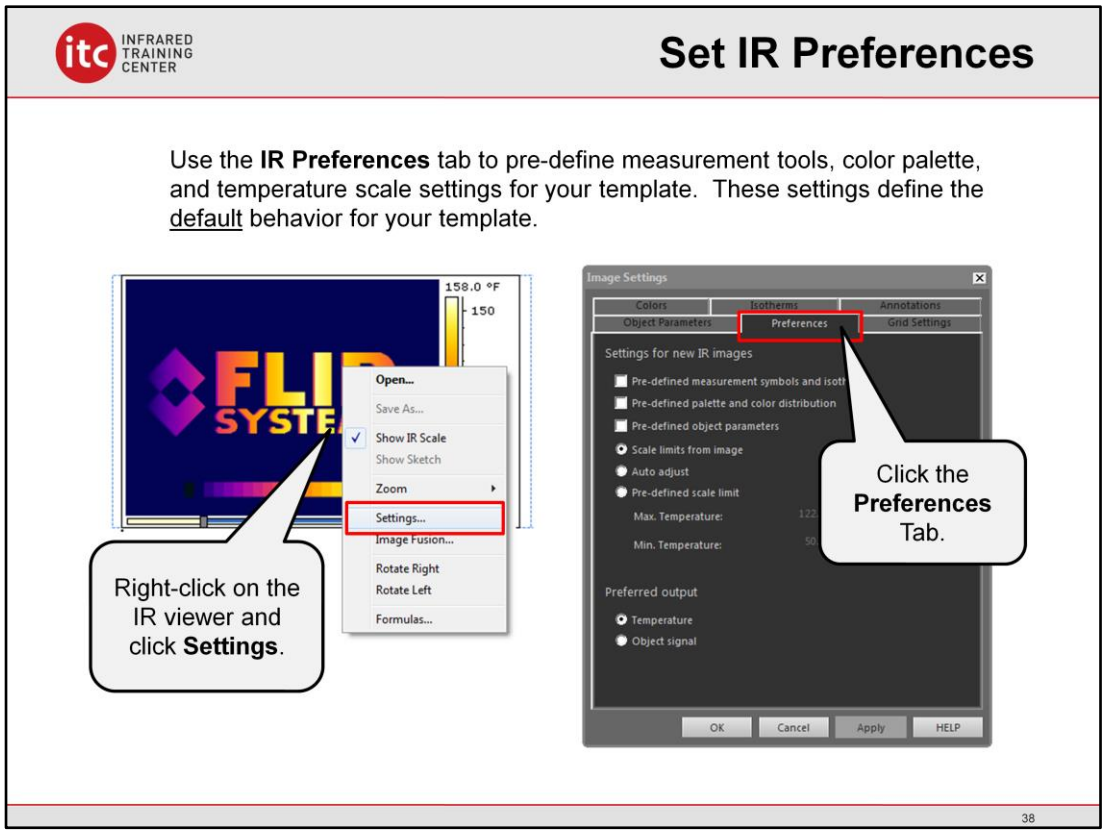
When adding items to a Word page it is good practice to insert them into Word tables. This allows you to easily place an IR Viewer next to a photo or a Result Table.



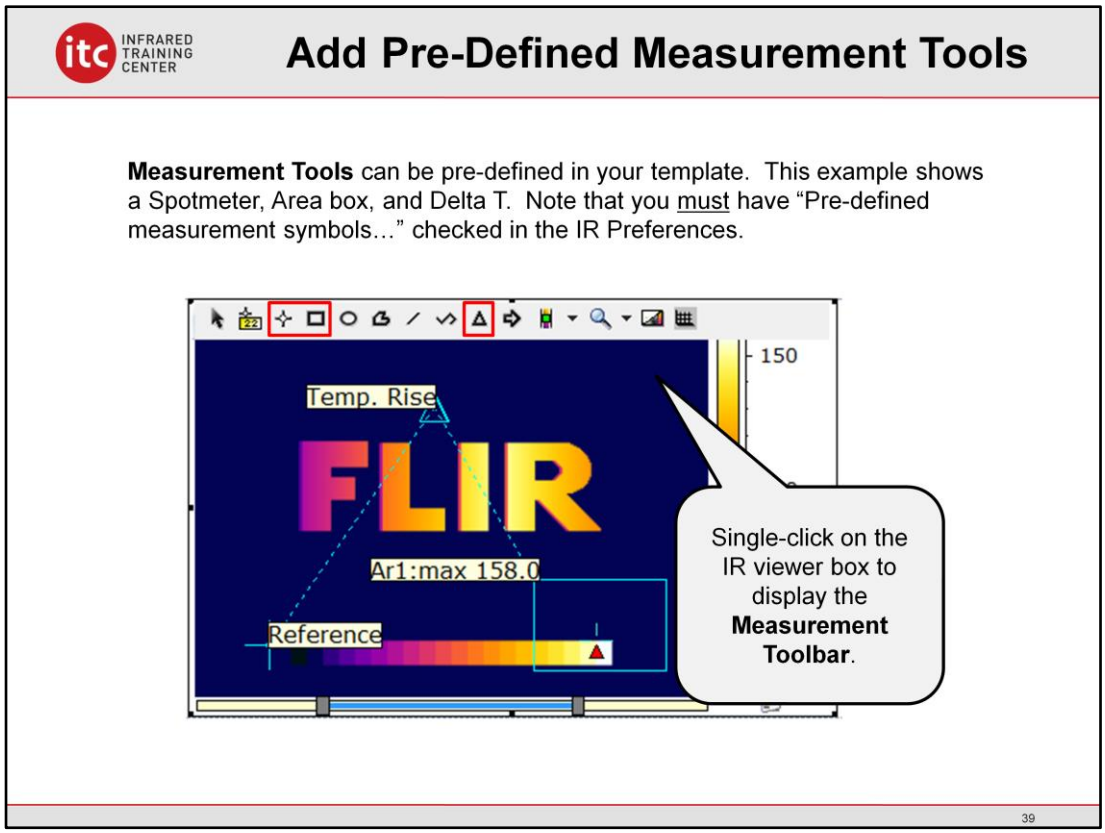
Add a Word table to the page with 1 row and 2 columns. Insert the IR Viewer into the first column, then insert the Digital Photo into the second column. You can resize either box by clicking and dragging the corners.



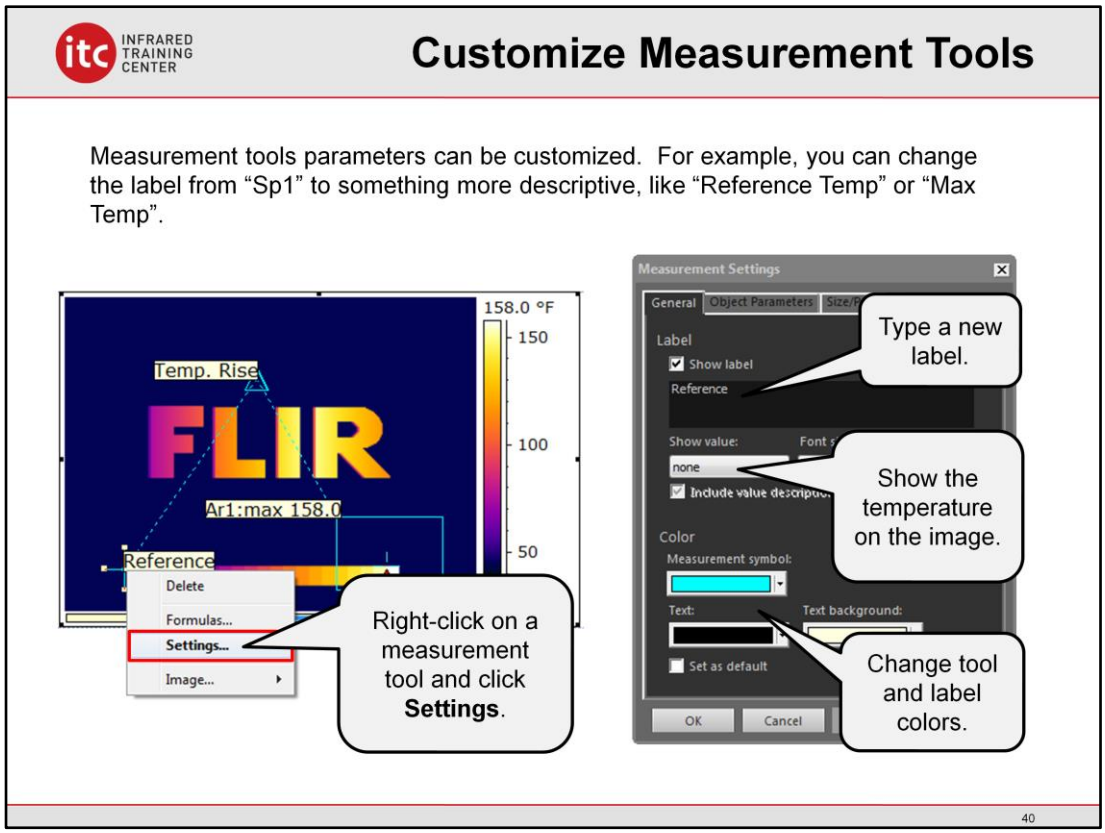
Since the temperature and distance units are typically the same for all reports it is best to set them in the template. You can always change them in the report if needed.



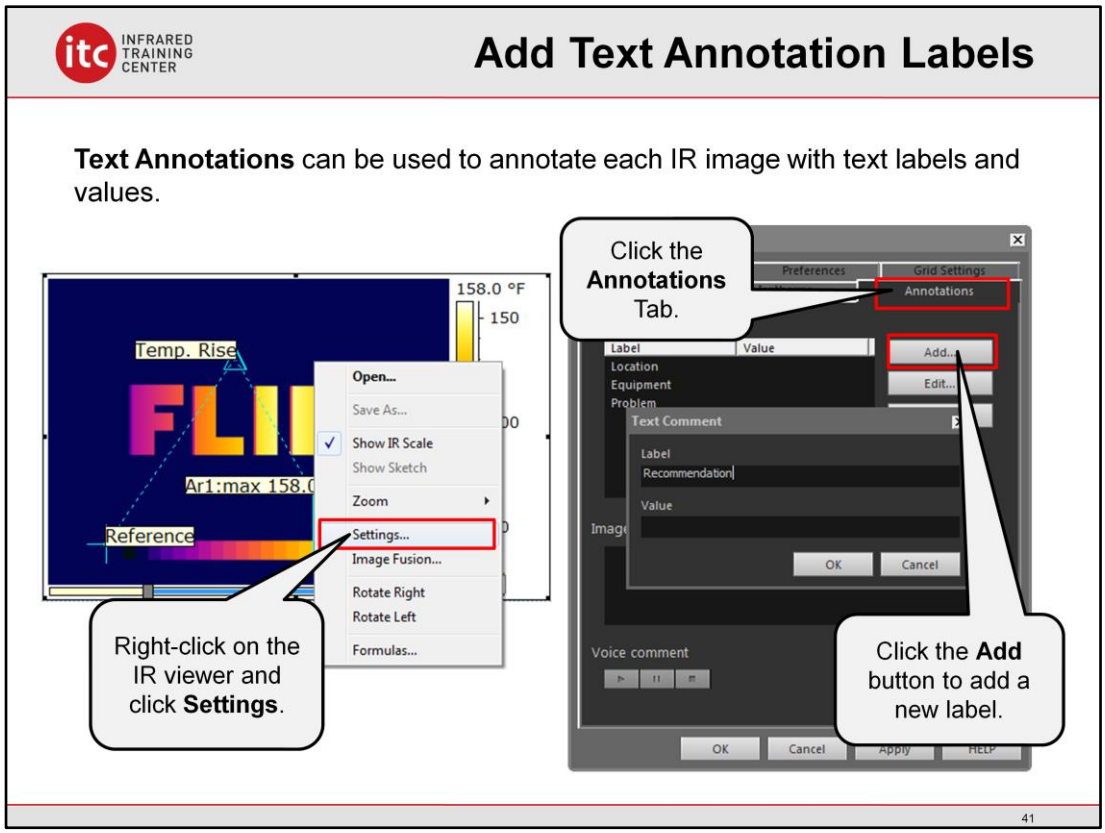
You can pre-define measurement tools in the template if you would like them to appear on all reports (e.g.: a spot meter and area box). You can pre-define other settings such as the color palette and scale limits.



If you click on the IR Viewer box the Measurement Toolbar will appear, allowing you to select from a variety of measurement tools.



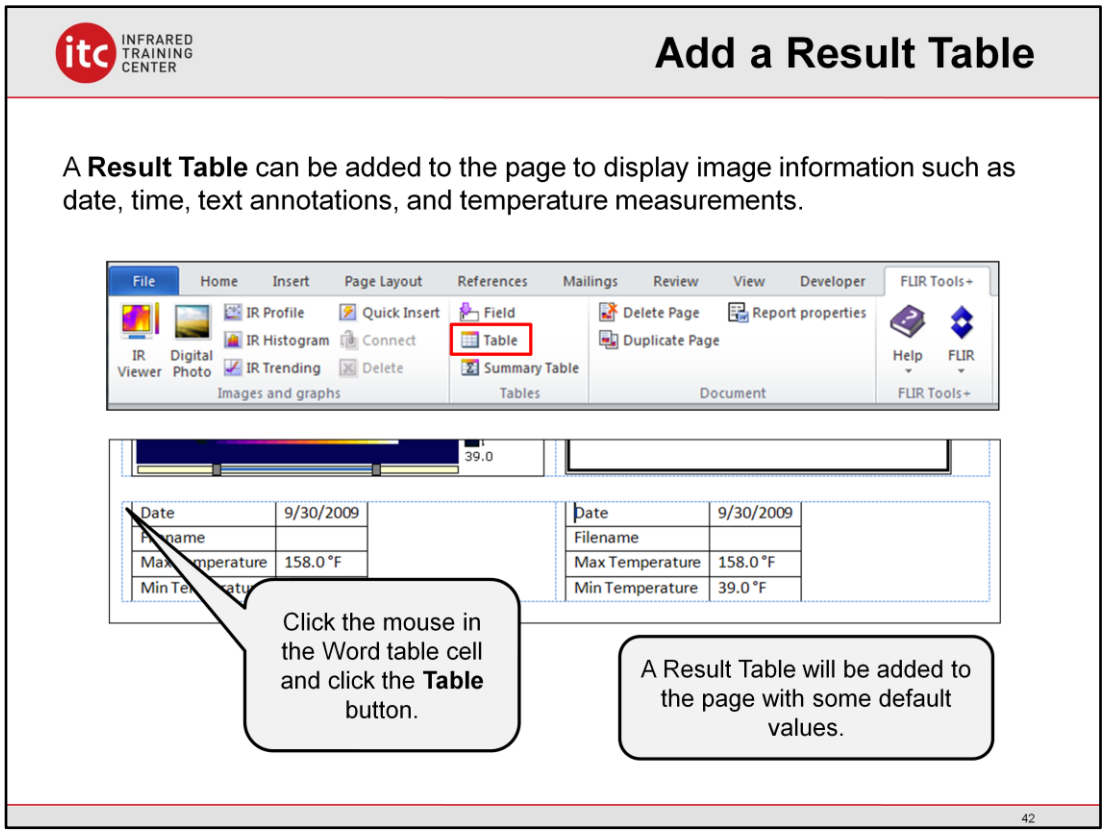
You can override the generic tool label and color for any measurement tool once it is placed on the IR Viewer. This can be done in the template and in the report.



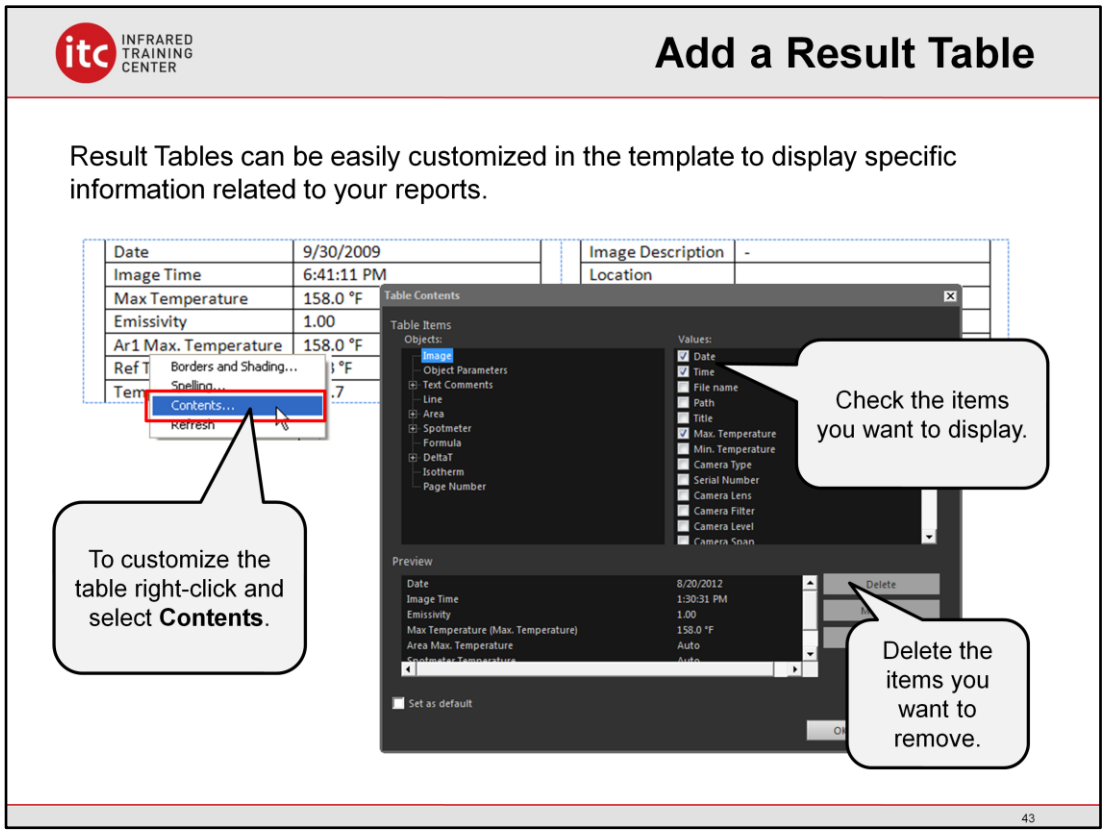
Text Annotation labels can be pre-defined in the template, as a formal way to "tag" the IR images with certain information. This data can be displayed using the IR tables and fields, including the Summary table.

If the same labels are used in a Text Annotation Template, the values will auto-populate the fields when the report is created.

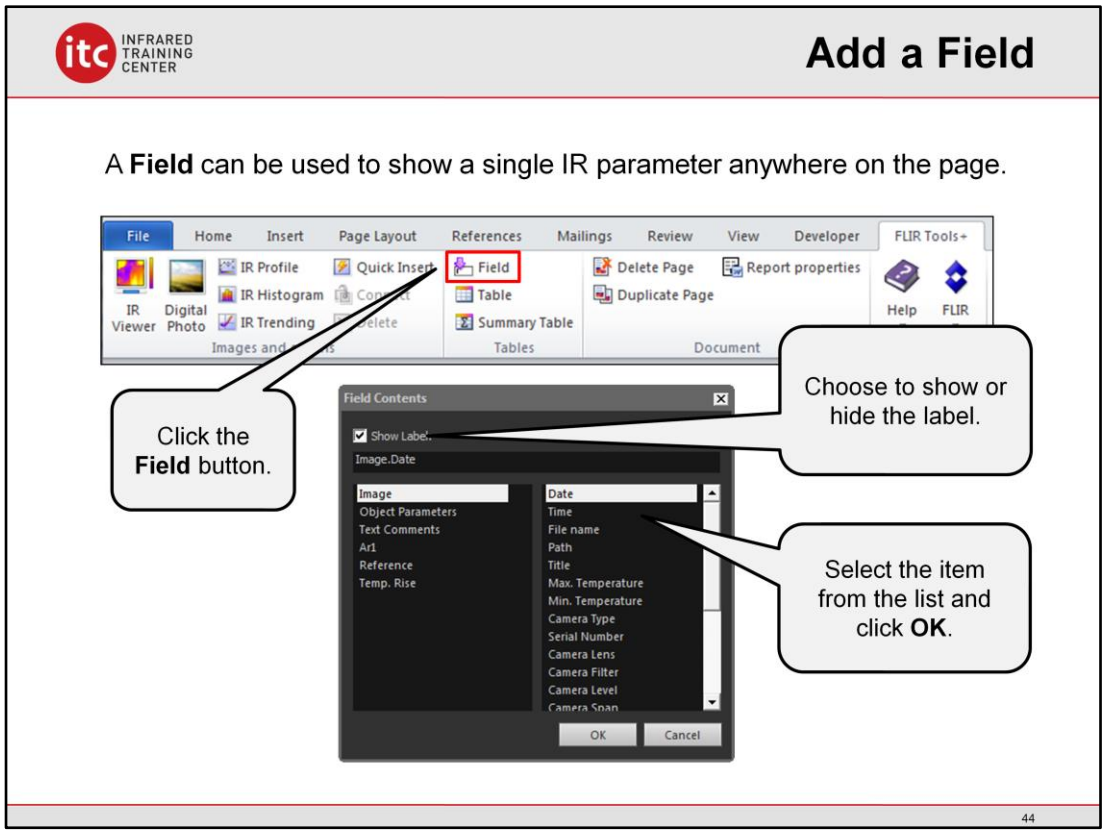
Another advantage of pre-defining the labels is that they become available for use in the Summary Table.



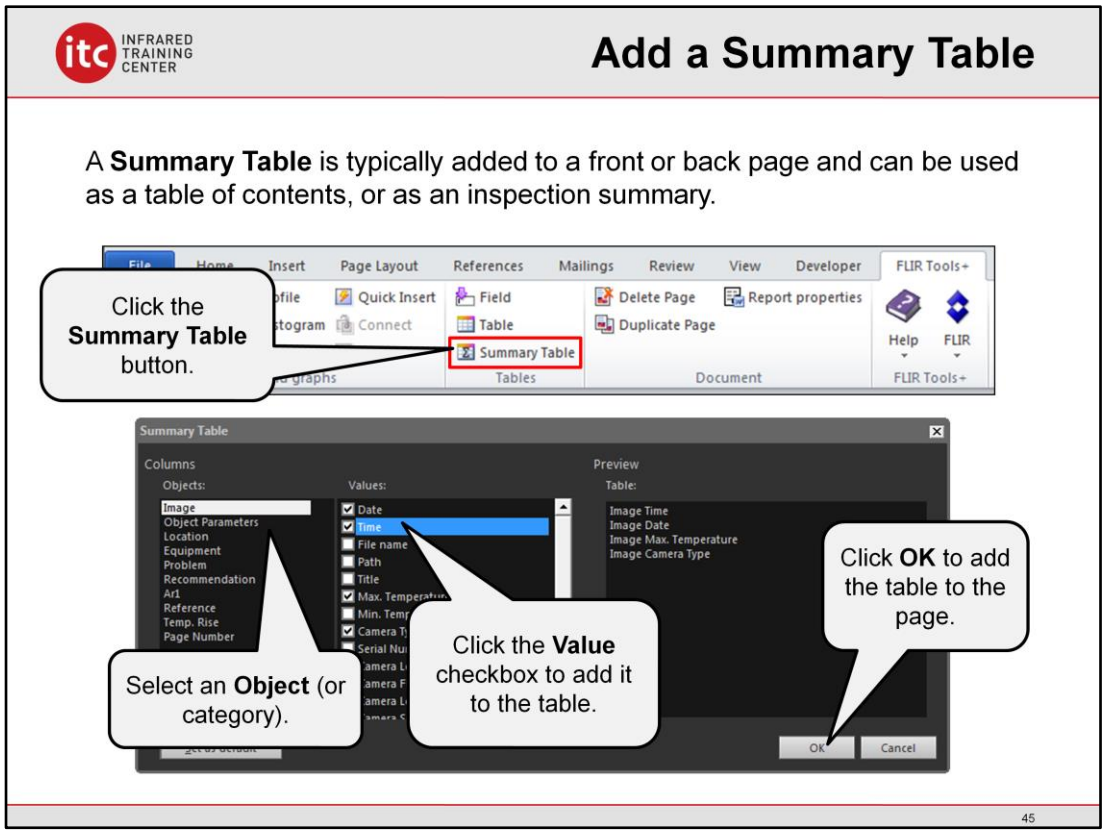
A Result Table is a special FLIR table that links to the IR Viewer on the page. It is always two columns wide, the number of rows depends on the user settings (see next step).



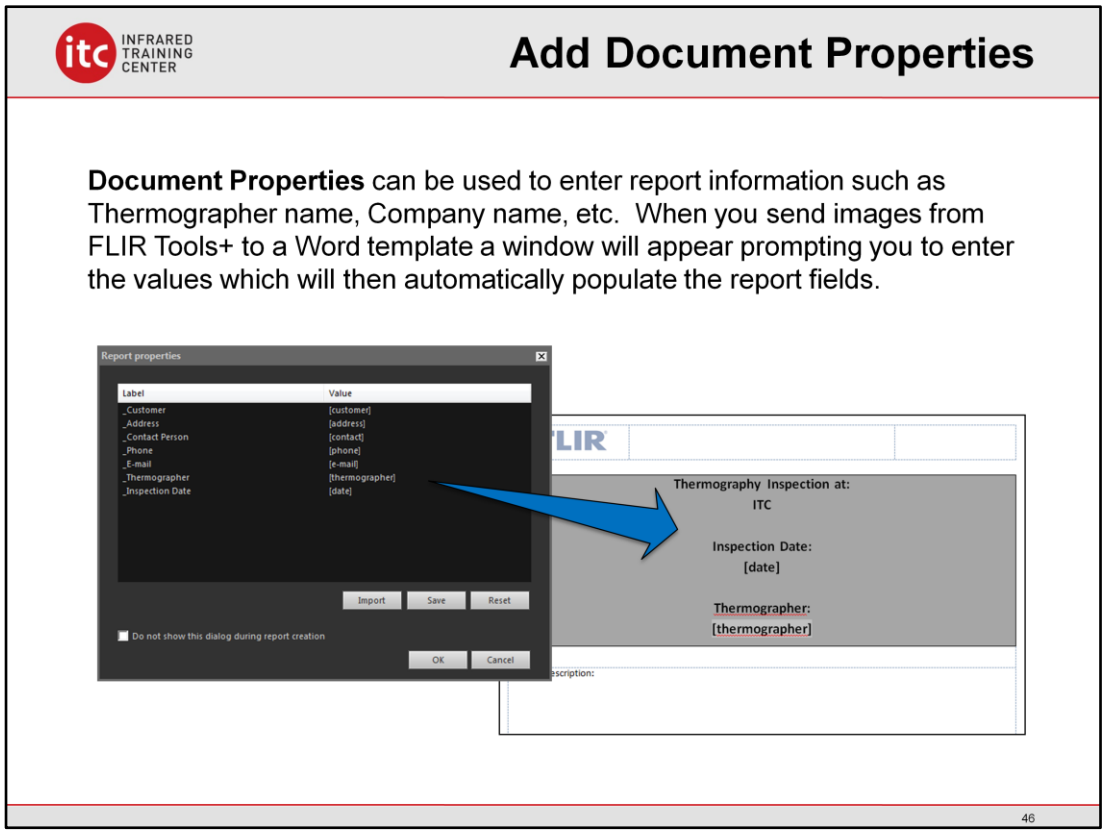
The Table Contents window is divided into two sections; the Objects are the categories, the Values are associated with the selected Object. Simply check the items that you want to display to add them to the table.



A Field can be used to show a single IR value on the page.



A Summary Table can be used on a front or back page. Similar to the Result Table, it is divided into Objects and Values. Select the desired checkboxes to create the table columns. Note that any Text Annotations created in the IR Viewer are shown in the Objects list.



Document Properties are a standard Word feature that is utilized by FLIR Tools+ when creating Word reports. The purpose is to allow the user to enter information about the report that would typically appear on the cover page. Word fields are used to display this information. Note that this information is not image-specific. Text Annotations should be used for image information.

The process of adding Document Properties varies depending on your Office version.

INFRARED TRAINING CENTER

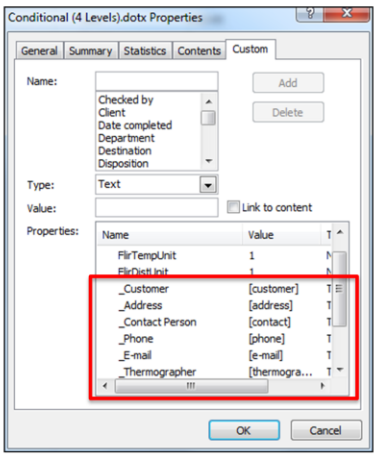
Add Document Properties
(Label Configuration)

The **Document Property** labels must adhere to a certain format in order for FLIR Tools+ to identify them.

First you must add this label and value:
FLIR_ReportPropertyPrefix = _

All FLIR Tools+ labels must begin with the _ character.

For example, a label for “Customer” should be entered this way: **_Customer**.



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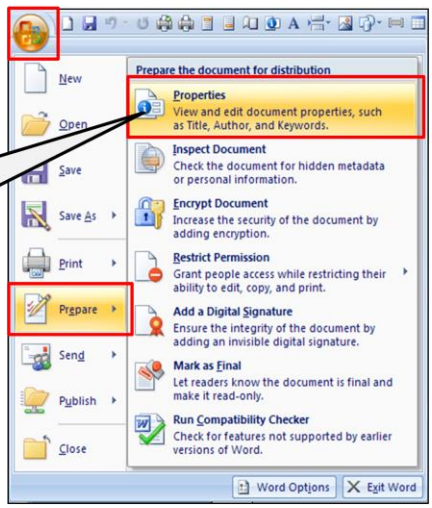
INFRARED TRAINING CENTER

Add Document Properties (Office 2007)

To add Document Properties click the **Office button**, then **Prepare**, then **Properties**.



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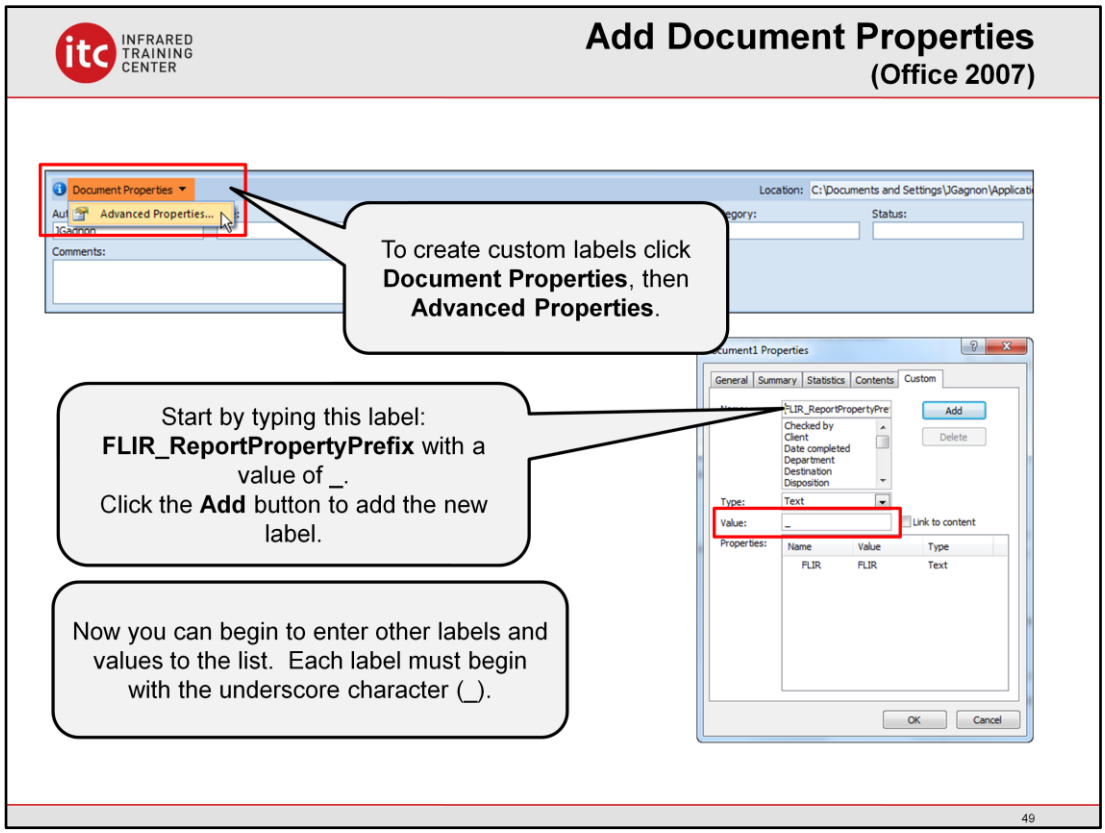
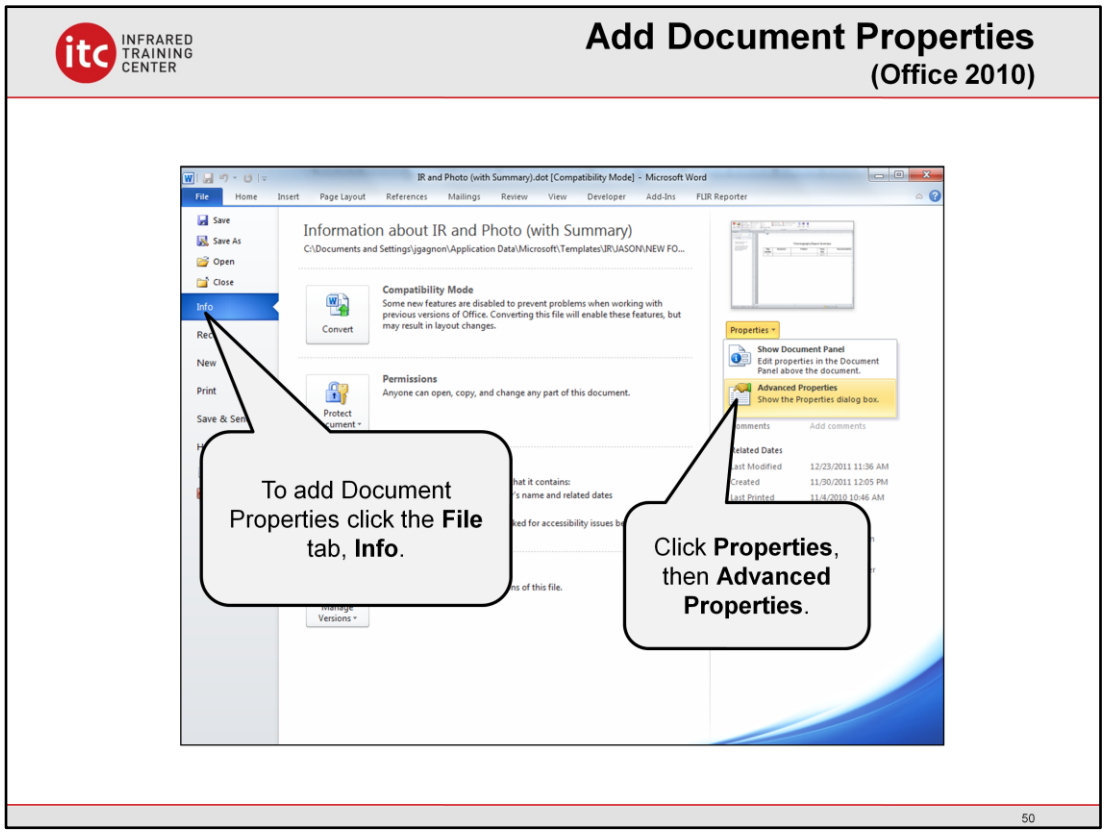


Select **Document Properties**, then **Advanced Properties**. The General tab shows some default properties, however you can easily create your own properties from the Custom tab.



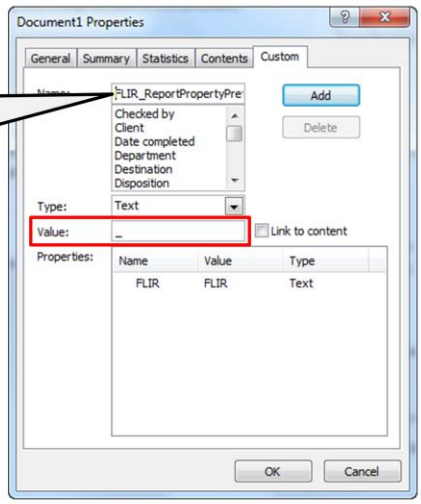
Click the **File** tab and select **Info**. Click **Properties**, then **Advanced Properties**.

INFRARED TRAINING CENTER

Add Document Properties (Office 2010)

Start by typing this label: **FLIR_ReportPropertyPrefix** with a value of _.
Click the **Add** button to add the new label.

Now you can begin to enter other labels and values to the list. Each label must begin with the underscore character (_).



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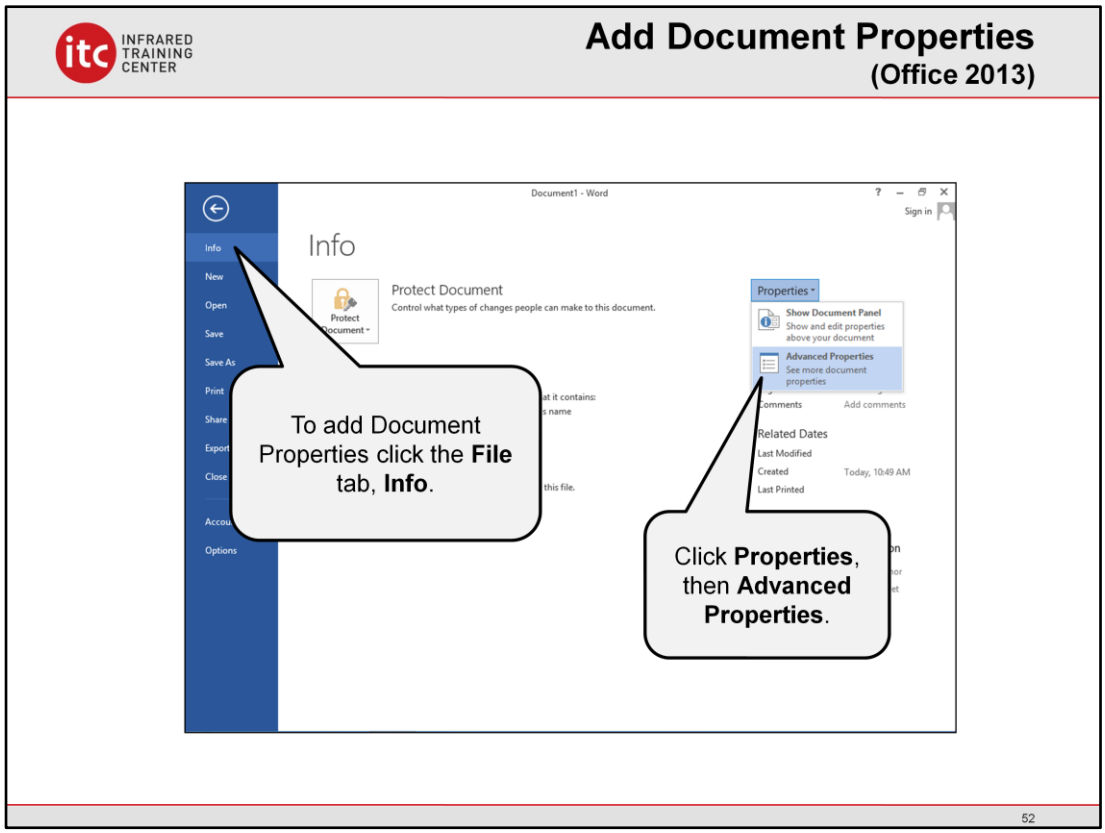


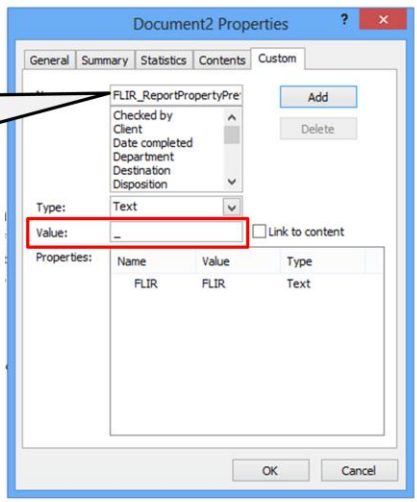
Click the **File** tab and select **Info**. Click **Properties**, then **Advanced Properties**.

INFRARED TRAINING CENTER

Add Document Properties (Office 2013)

Start by typing this label: **FLIR_ReportPropertyPrefix** with a value of _.
Click the **Add** button to add the new label.

Now you can begin to enter other labels and values to the list. Each label must begin with the underscore character (_).



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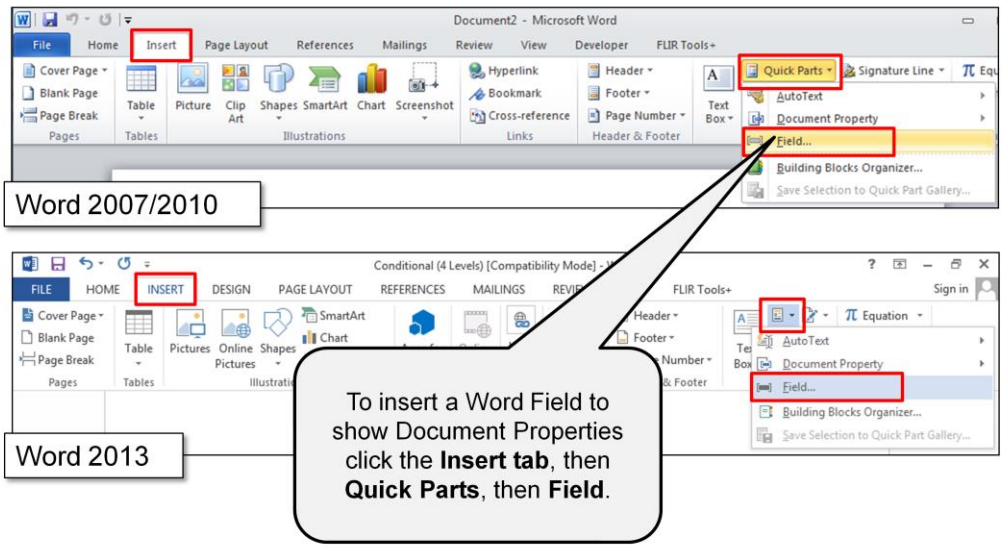
INFRARED TRAINING CENTER

Show Document Properties

Document Properties can be shown on the page using Word's **Field** tool.



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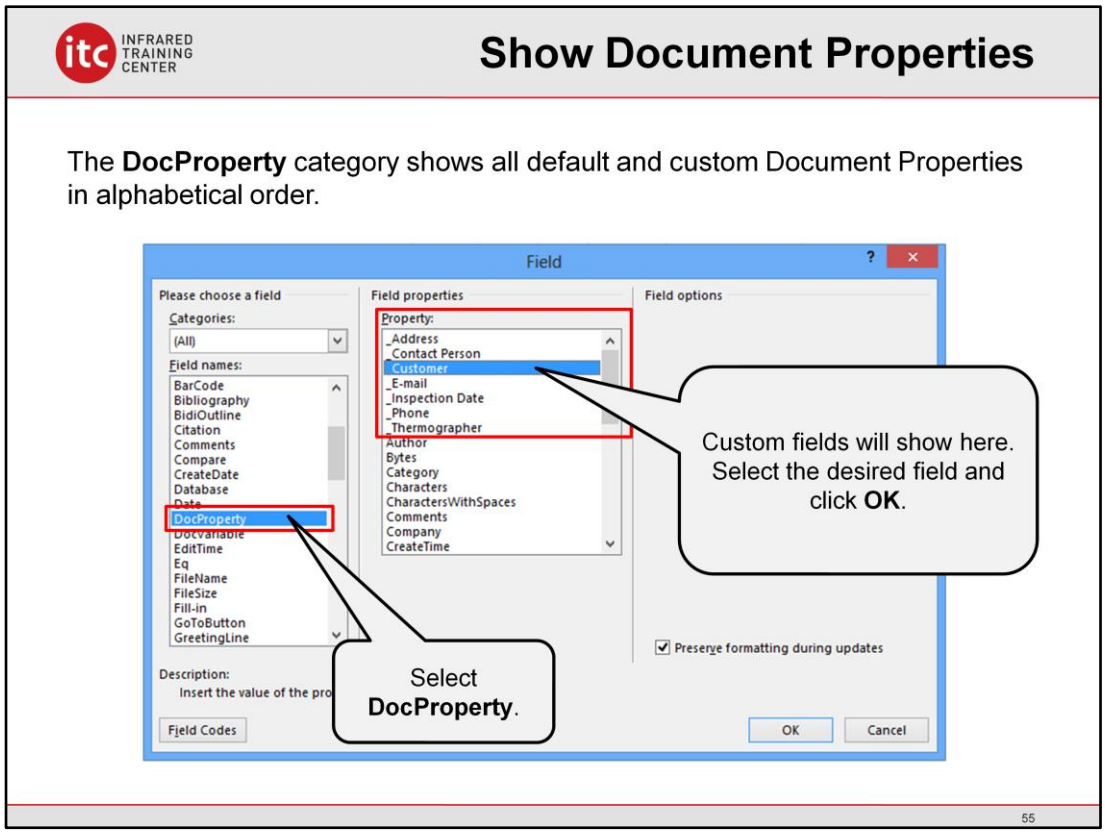
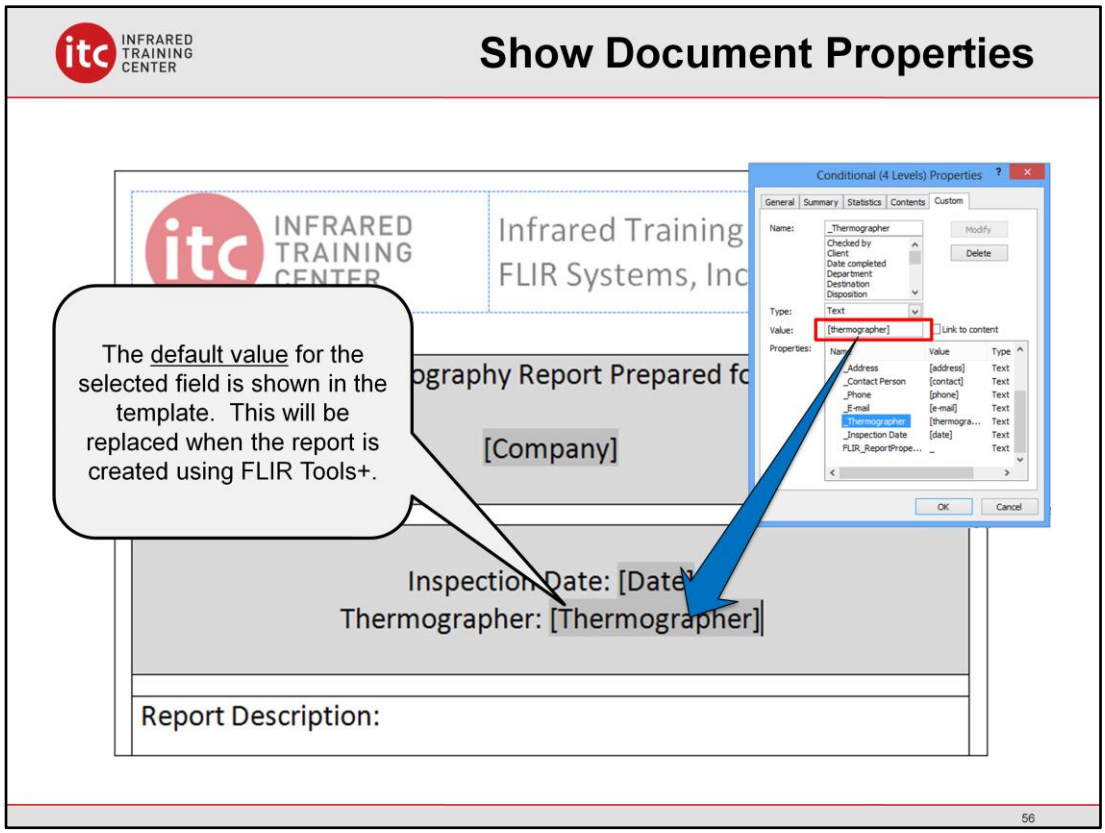
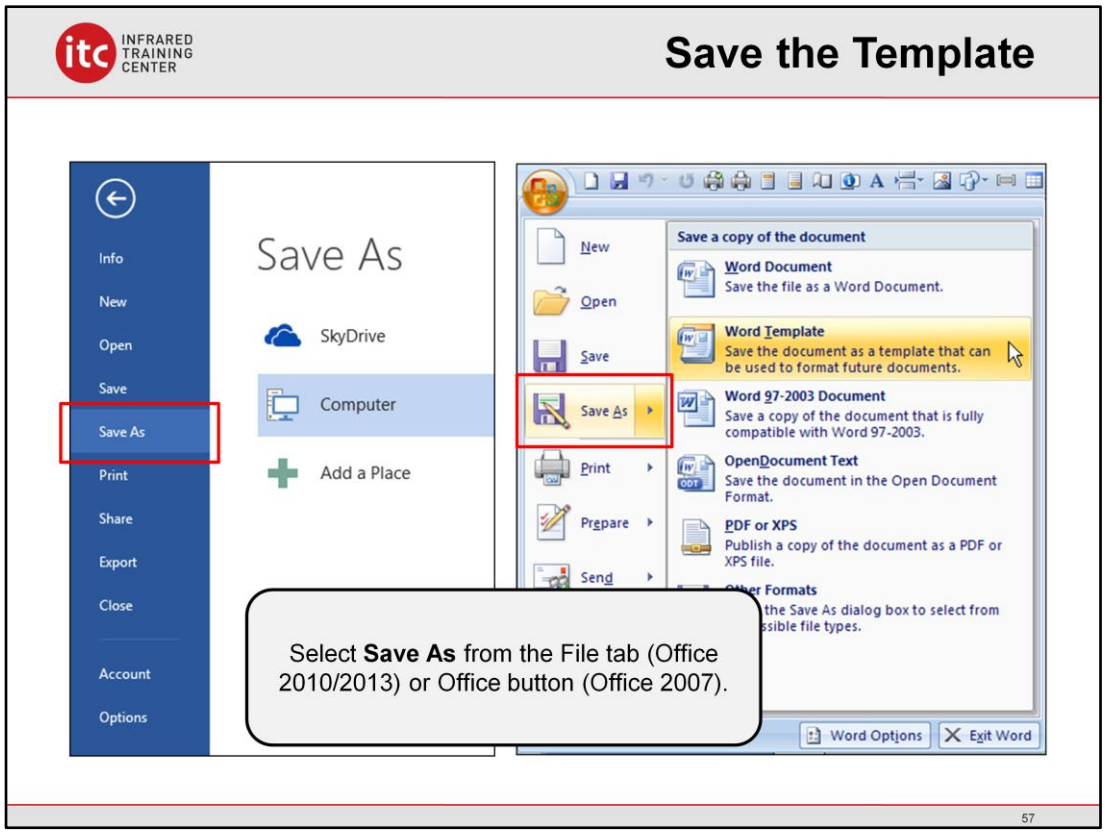


DocProperty shows all default and custom Document Properties.

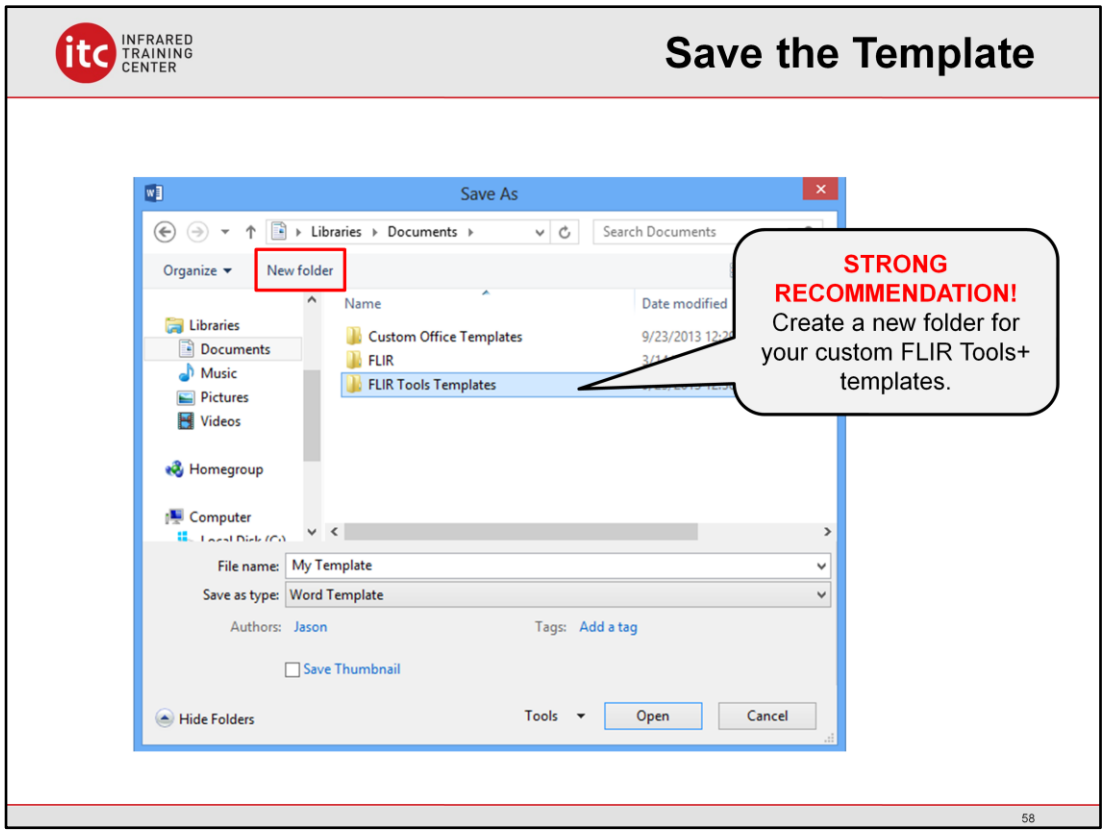


When you insert the selected Document Property the default value is shown on the template page. When the report is created you will have the opportunity to replace this value with text that applies to the report you are creating.



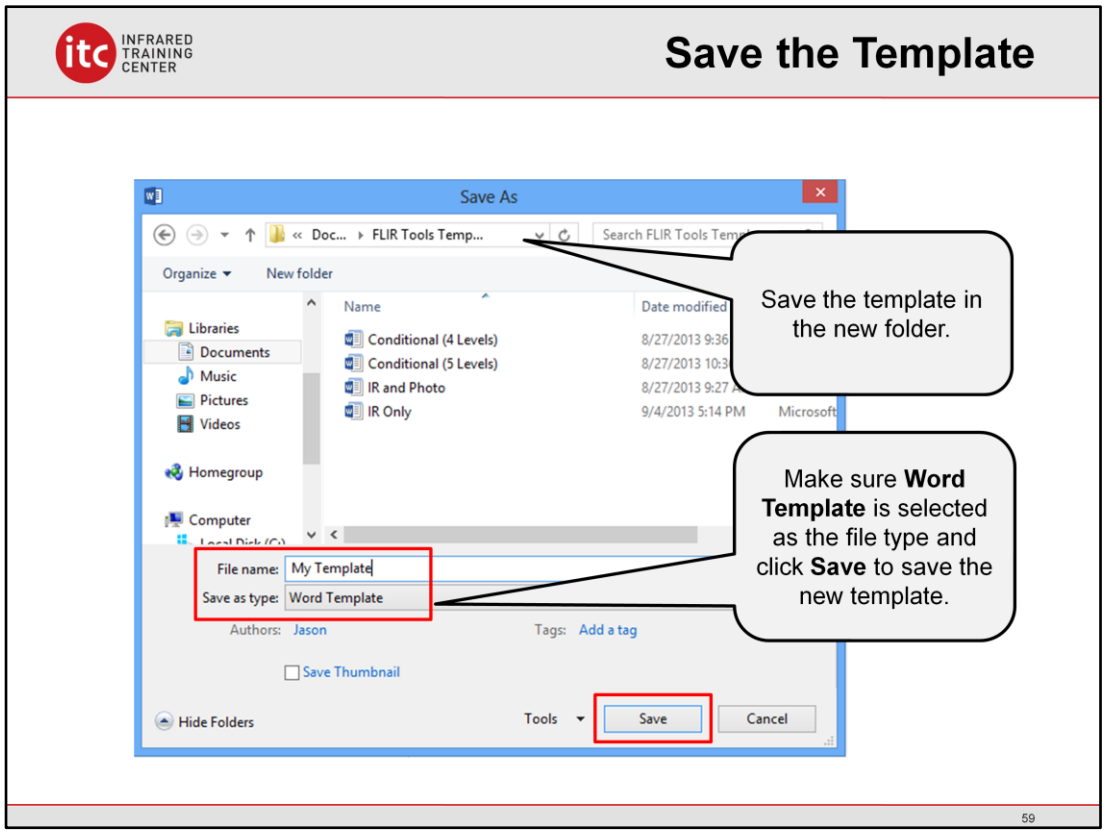
Save the template as a standard Word Template file:

Office 2007: Click the Office button, Save As, Word Template.
Office 2010/2013: Click the File tab, Save As, and choose Word Template as the document type.

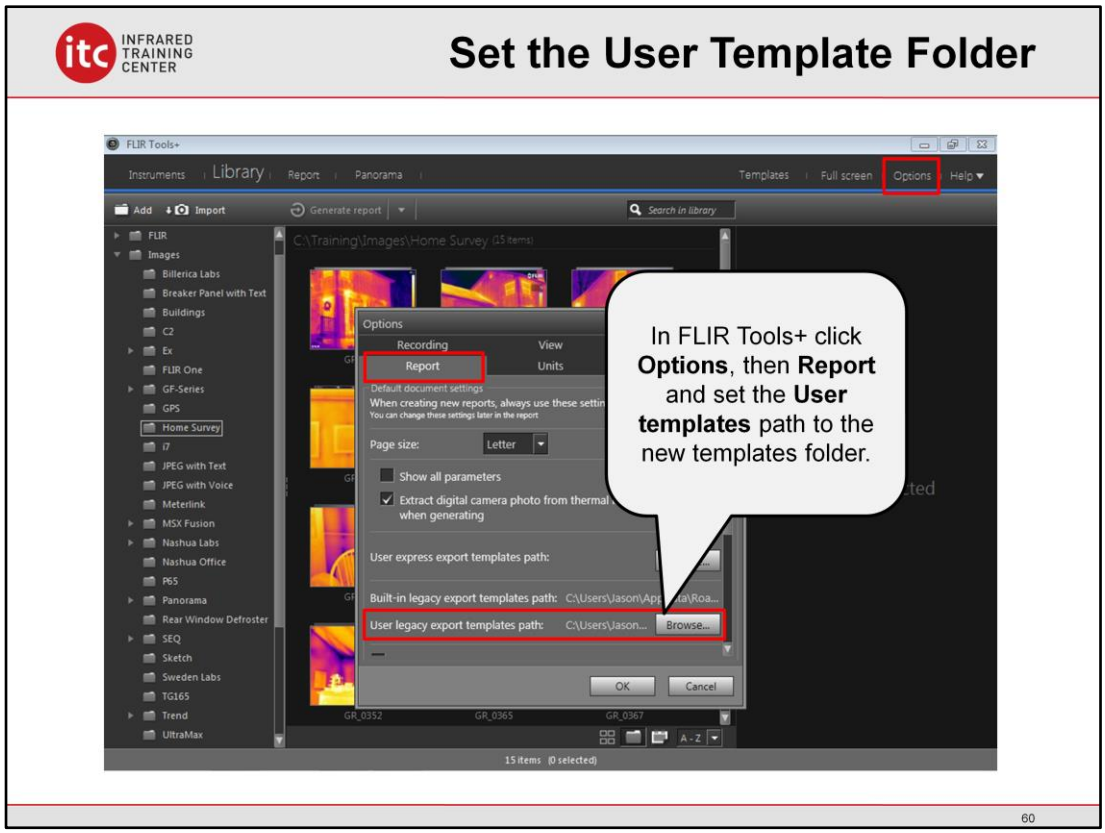


FLIR Tools+ allows you to set a user templates path. This means that you can store custom template in a folder that is easy to find, instead of using the default Microsoft folder for templates. Also, you'll be assured that the templates are secured with your back-up software!

For example, you can create a new folder in My Documents called "FLIR Tools Templates" and use this as your user templates path.



All your custom FLIR Tools+ templates can be saved in this new folder.



In FLIR Tools+ you must set the user templates path so you can select templates from the new folder:

Click **Options**, then **Report**.
Click **Browse** next to “user legacy export templates path” and select your new template folder (in this case \My Documents\FLIR Tools Templates).

The Report Generation Process

- Import the images from the Infrared camera into their appropriate folder.
- Modify the images if required such as:
  - Level and Span
  - Placement/modification of image measurement tools
  - Adjust object or measurement tool parameters
  - Addition or modification of text annotations
- Select the images to be used in the report.
- Select the “Word” template to generate the report.
- Fill in the “Word Document Properties” if required.
- Make any minor adjustments to the image if required.

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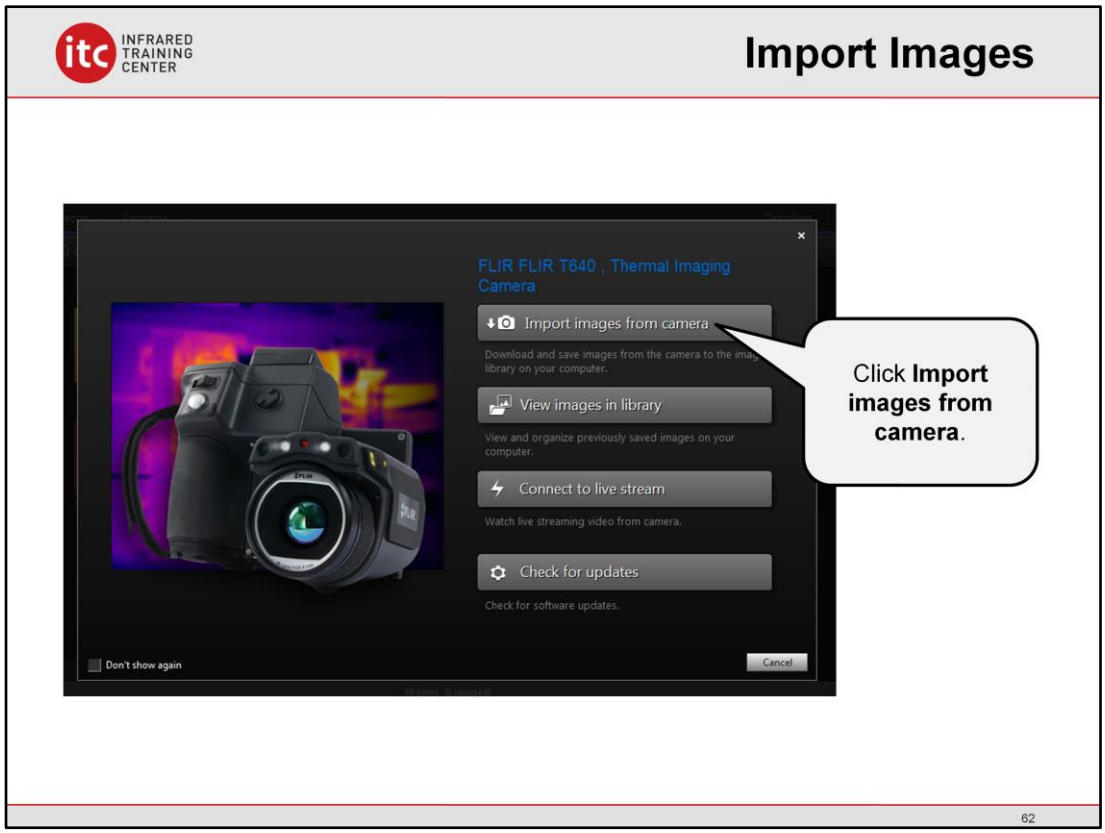
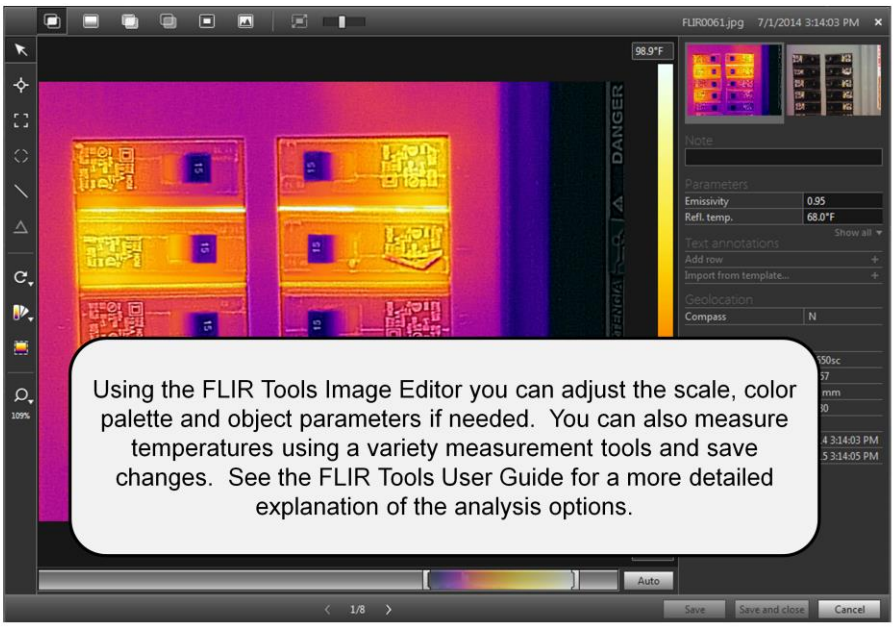


If you connect a camera via USB while FLIR Tools is running a startup screen will appear with links to common functions. Click the button to **Import images from camera**.

View images in library will close the startup screen and show the image library.
Connect to live stream will display a live image from compatible FLIR cameras.
Check for updates will check for FLIR Tools updates. It can also check for updates for certain FLIR USB cameras.

INFRARED TRAINING CENTER

Analyze Images



Using the FLIR Tools Image Editor you can adjust the scale, color palette and object parameters if needed. You can also measure temperatures using a variety measurement tools and save changes. See the FLIR Tools User Guide for a more detailed explanation of the analysis options.

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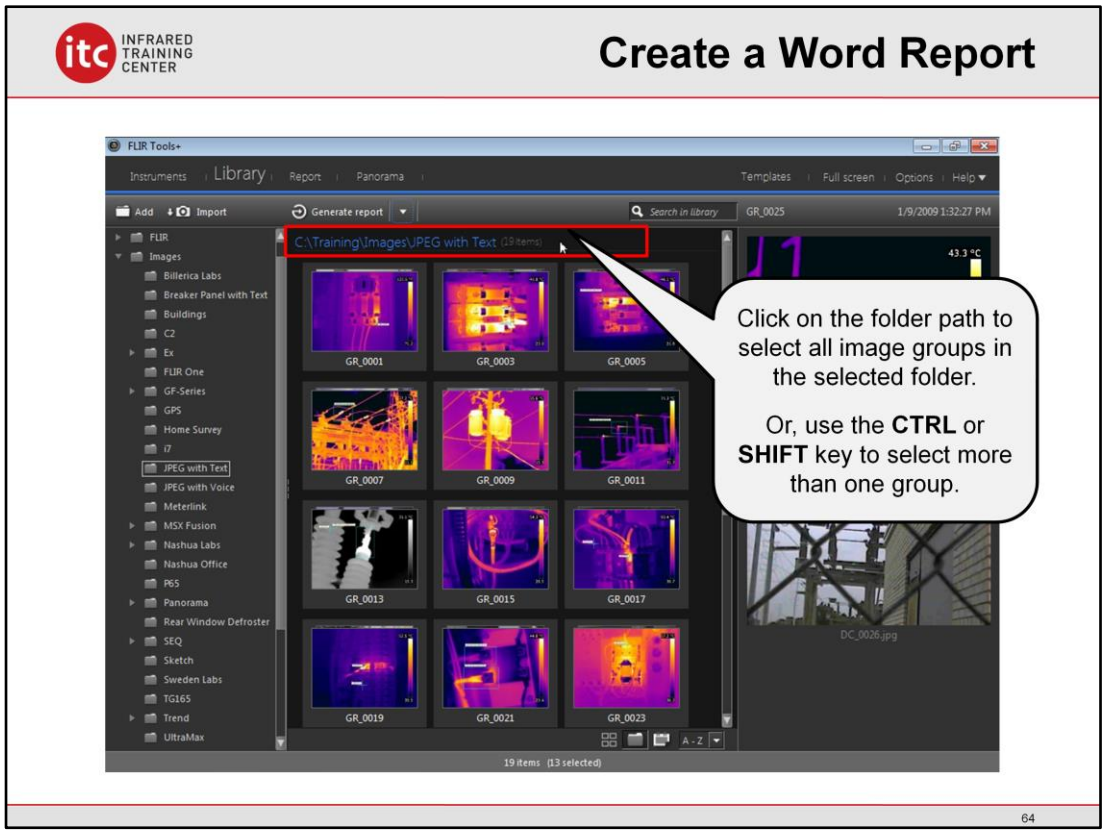
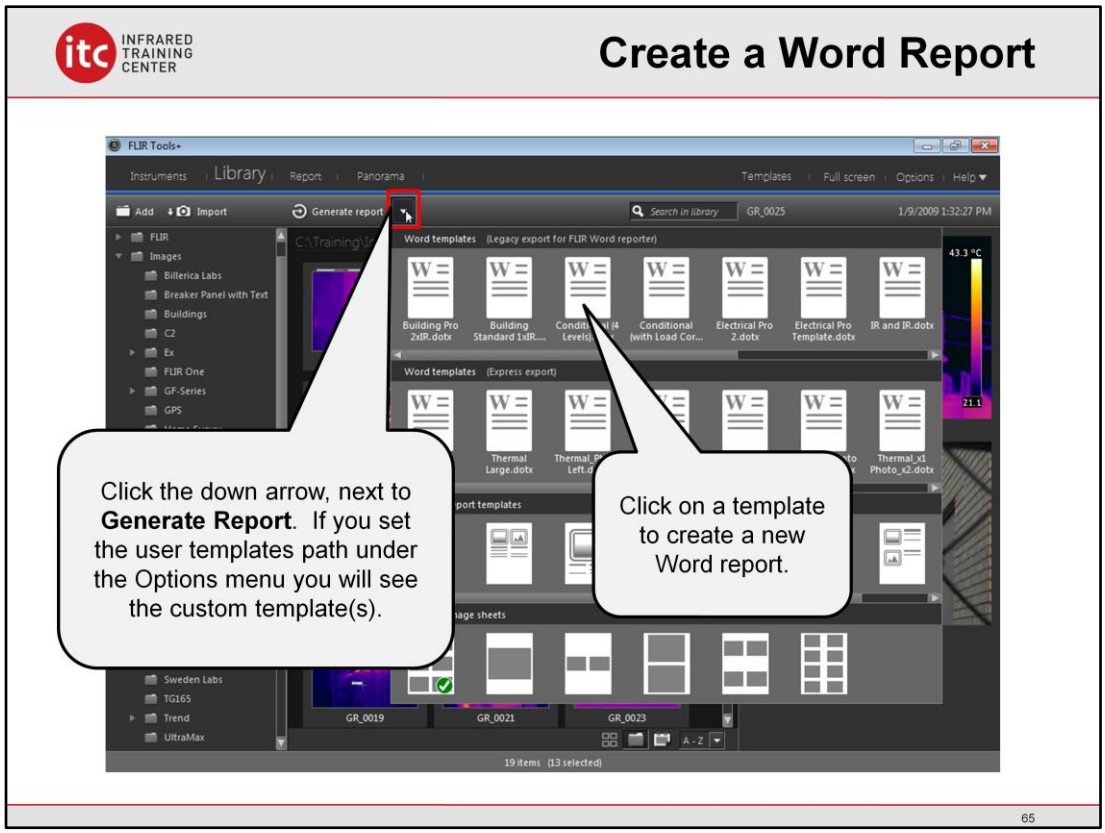


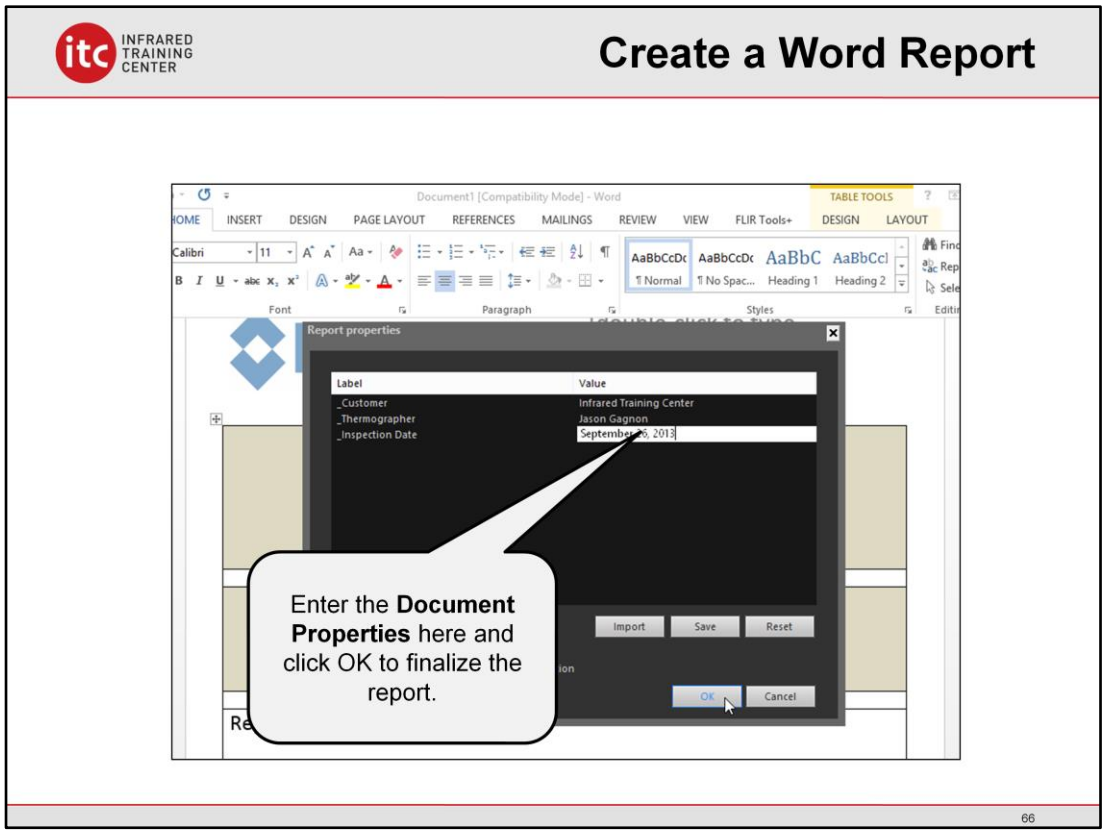
From the FLIR Tools library you can select the groups to send to the new report. A quick and easy way to select everything in the folder is to click on the path. This will automatically select everything in the current folder.

Another option is to use the SHIFT key to select everything in between two groups (e.g.: click on GR_0001, hold down SHIFT, and click on GR_0011). Or, hold down the CTRL key to select random groups.



With the images selected, click the down arrow next to **Generate Report**. FLIR Tools+ will show some sample Word templates and any custom templates that have been created and saved to the user templates folder. Simply click on the template you wish to use to begin creating the Word report.

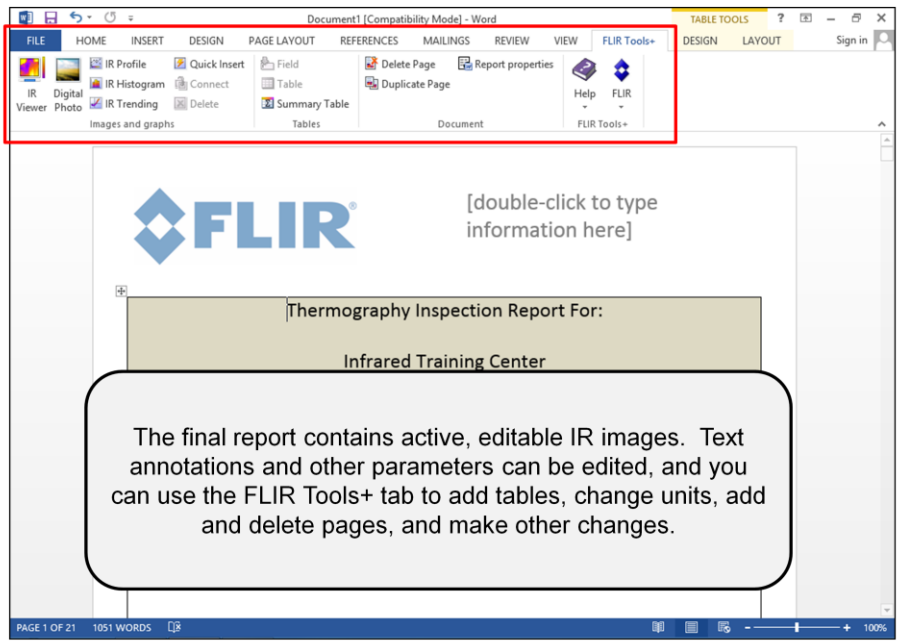
Note: Be sure to set the user templates path from **Options**, **Report**, otherwise the custom templates will not appear as a choice.



Any Document Properties that were added to the template will appear in a window before the final report is made. This allows you to enter the desired values, which will then automatically populate the fields in the Word report.

INFRARED TRAINING CENTER

Create a Word Report



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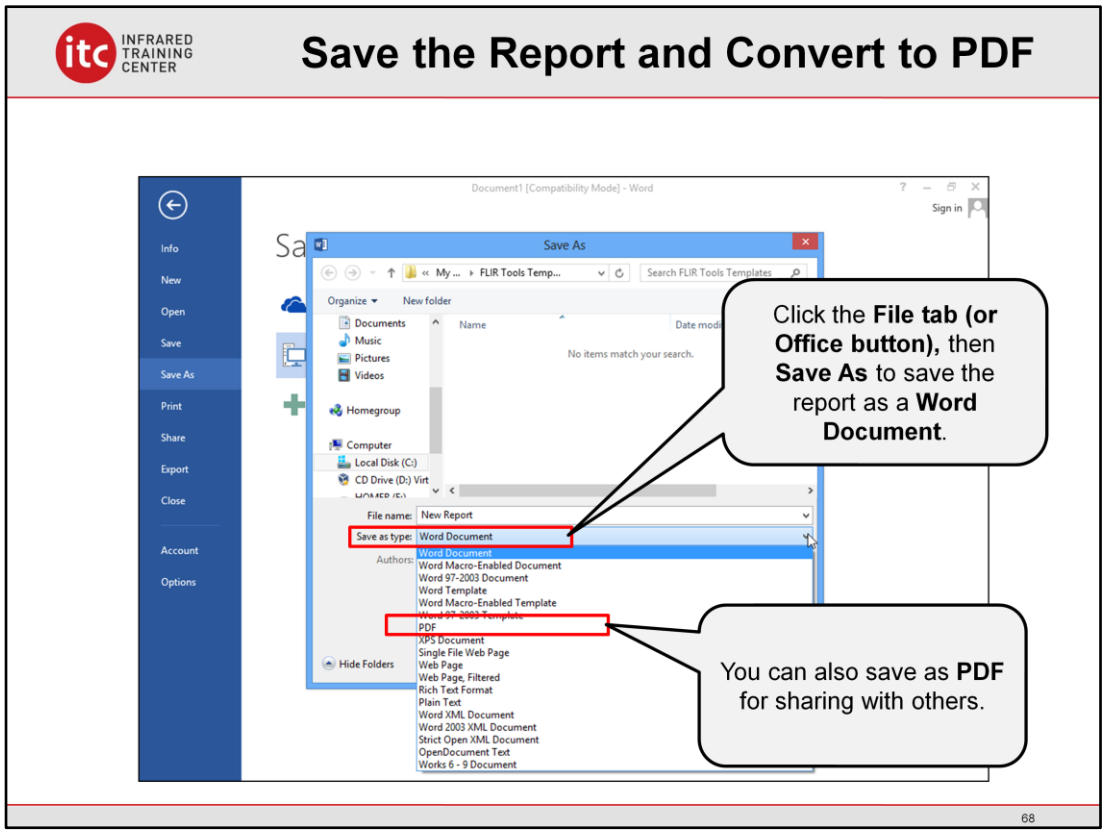
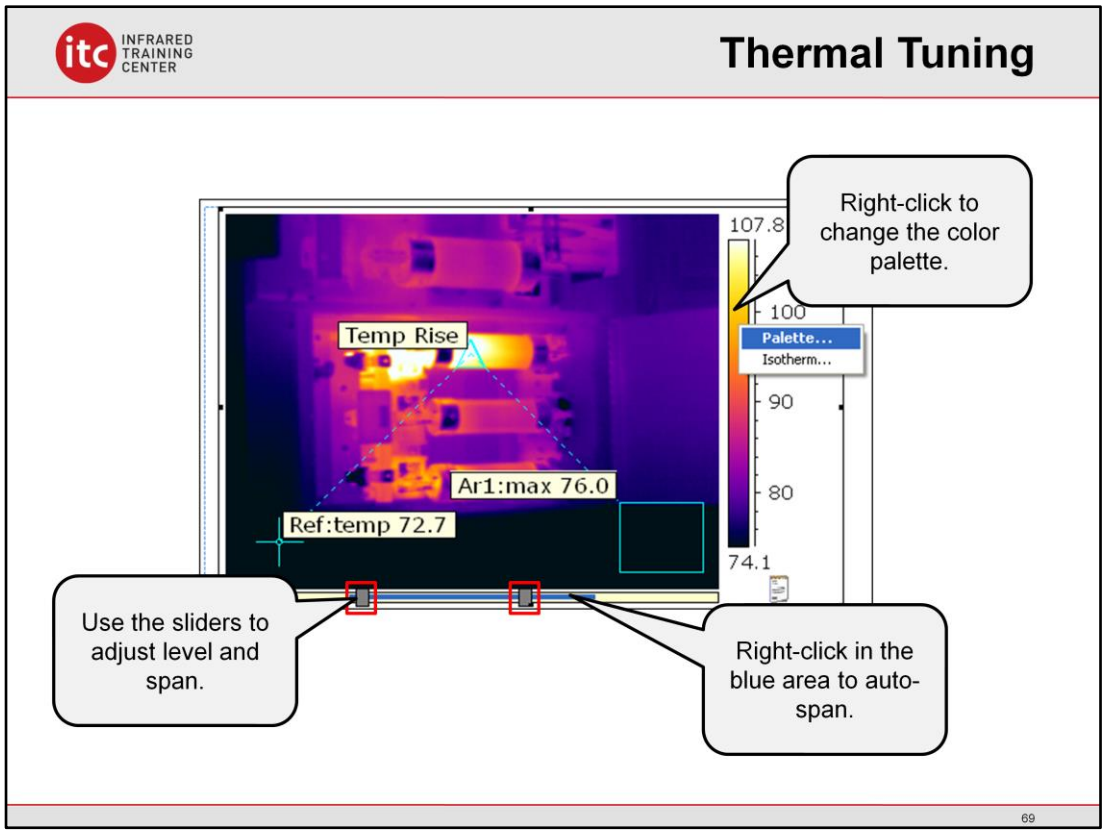
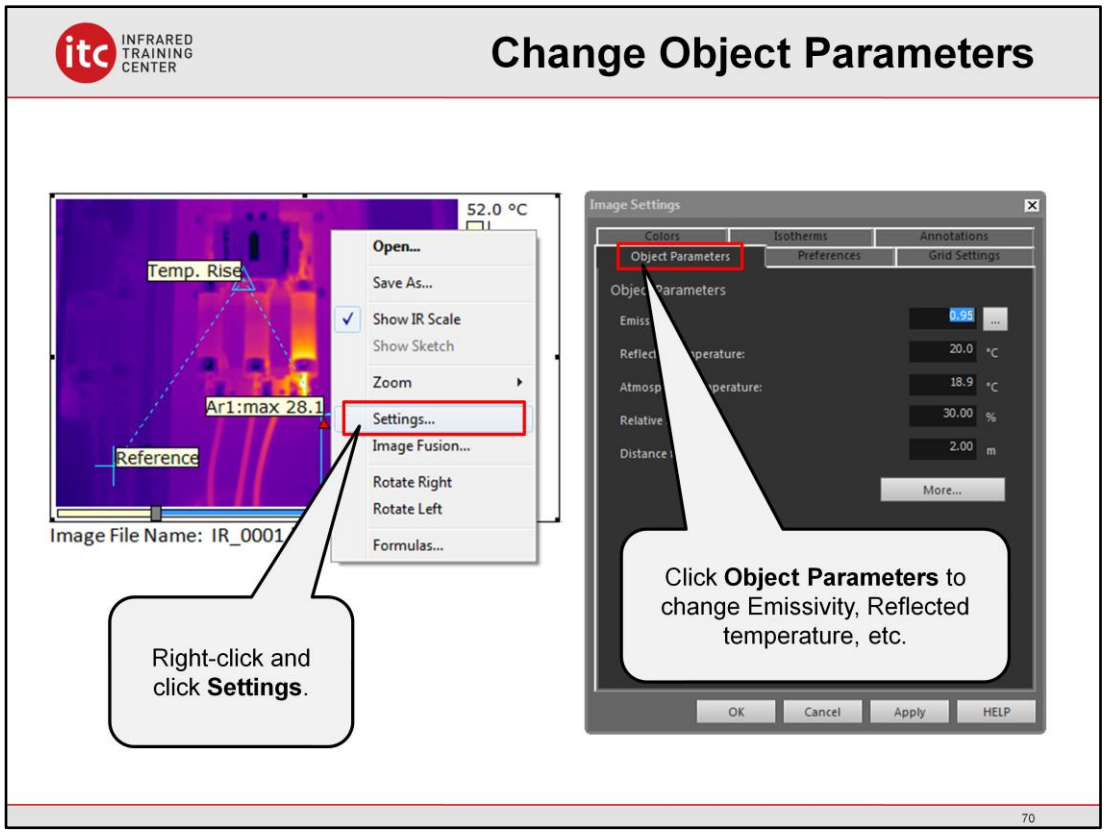


It is important to save the report as a Word document. The Word report contains copies of all the images, allowing you to return to the report at any time to make changes. Anyone with Word can view the document, but the IR image cannot be manipulated without FLIR Tools+.

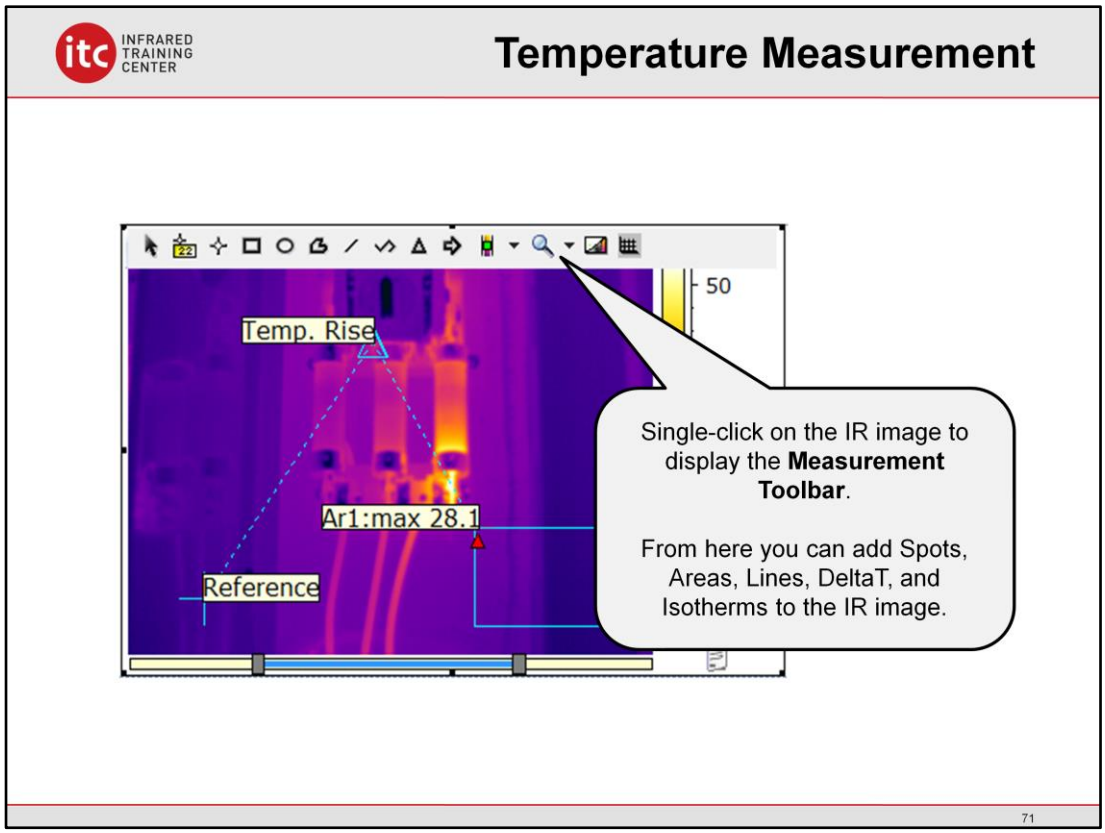
You can also save a PDF copy of the report, which is handy for sharing with customers and colleagues.



Since the infrared image is active in the Word document you can adjust the level, span, and color palette, just like you can using the FLIR Tools editor.

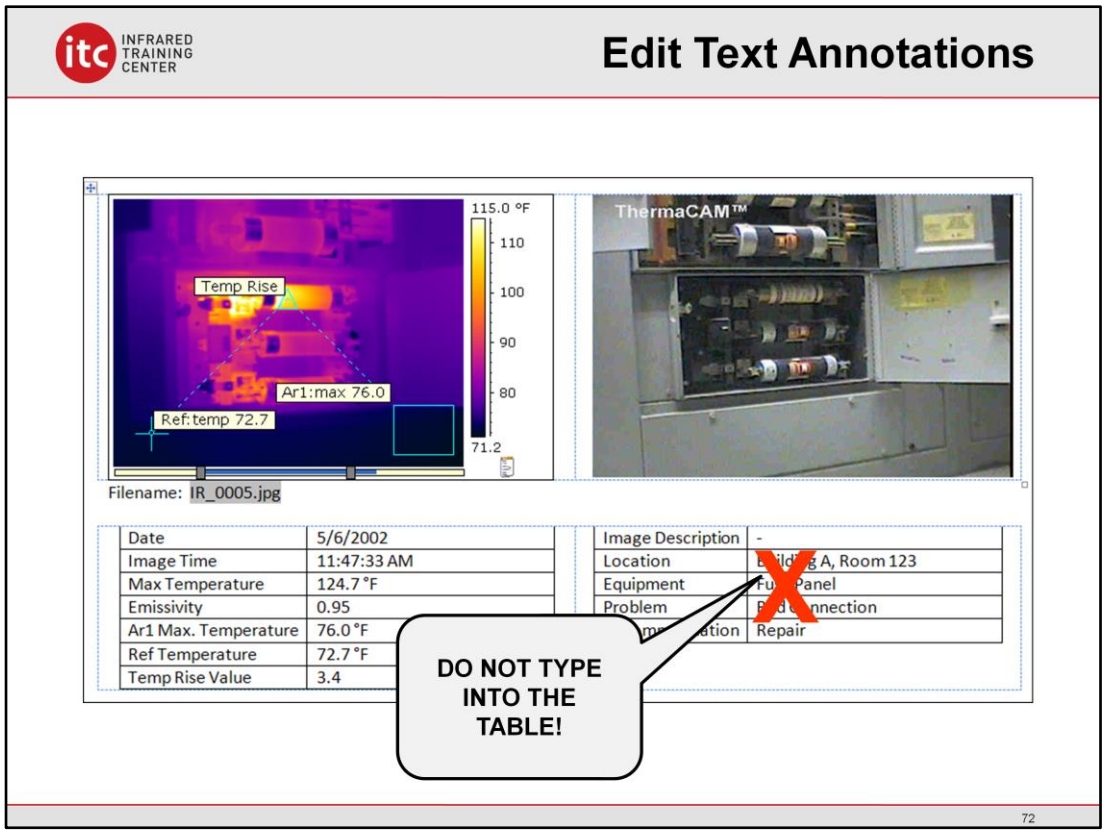


Right-click on the IR image and click **Settings** to change emissivity, reflected temperature, and other Object Parameters.

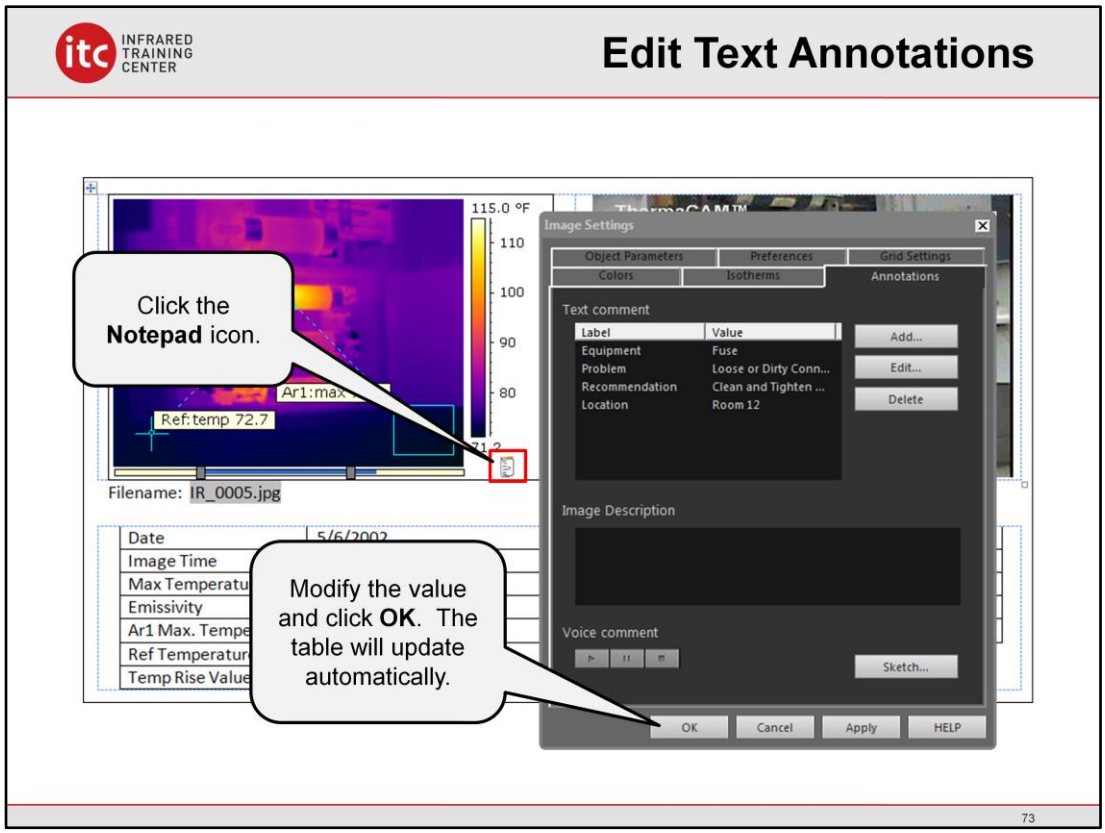


This image has a Spot Meter, Area Box, and DeltaT because these tools are pre-defined in the template. You can click and drag any of these tools to re-position them on the image. Tables linked to these tools will update automatically.

If you single left-click on the image the **Measurement Toolbar** will appear. This allows you to add new measurement tools if needed. The Word add-in provides some additional tools that are not available in the FLIR Tools editor:
Polygon Area
Bendable Line
Arrow Marker
Image Fusion
Grid



Text Annotations are displayed in a Result Table that is linked to the IR image on the page. DO NOT type into this table. If you type into the table everything you type will be erased the next time the table refreshes. The next step explains how to properly edit Text Annotations.



Text Annotations values must be edited by using the Notepad icon on the IR image. The text shown in the table will update automatically.

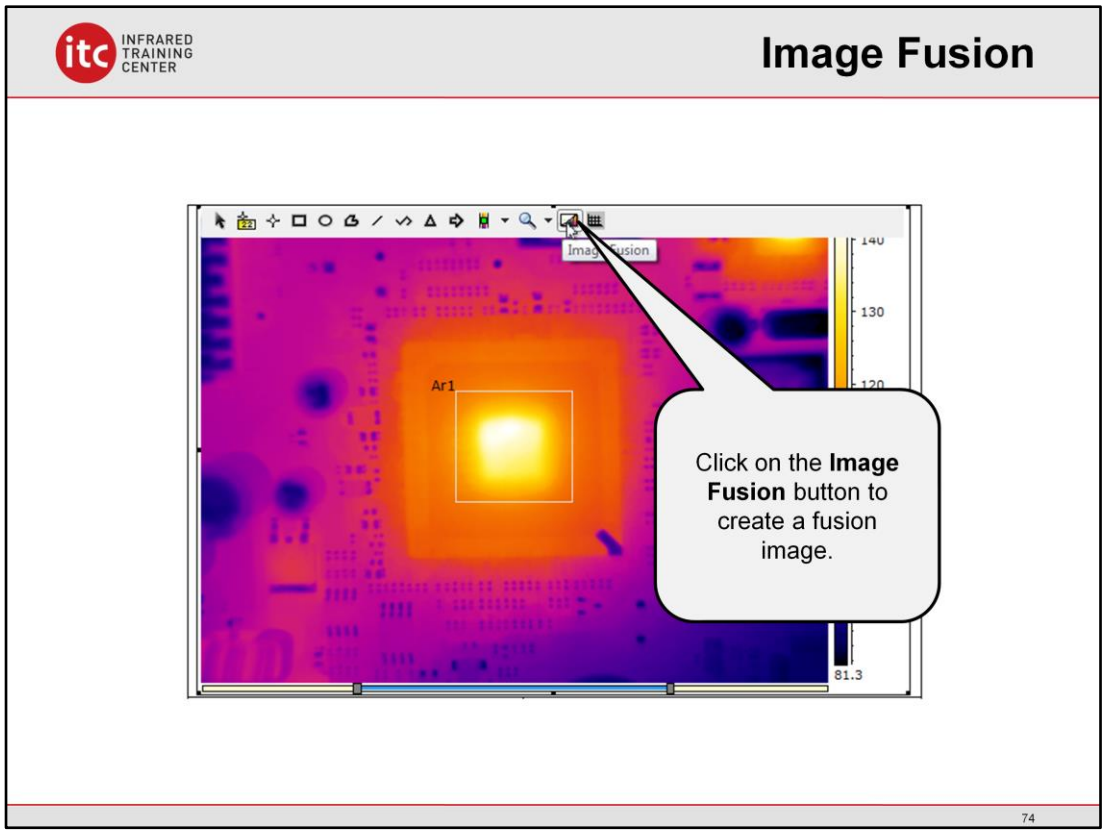
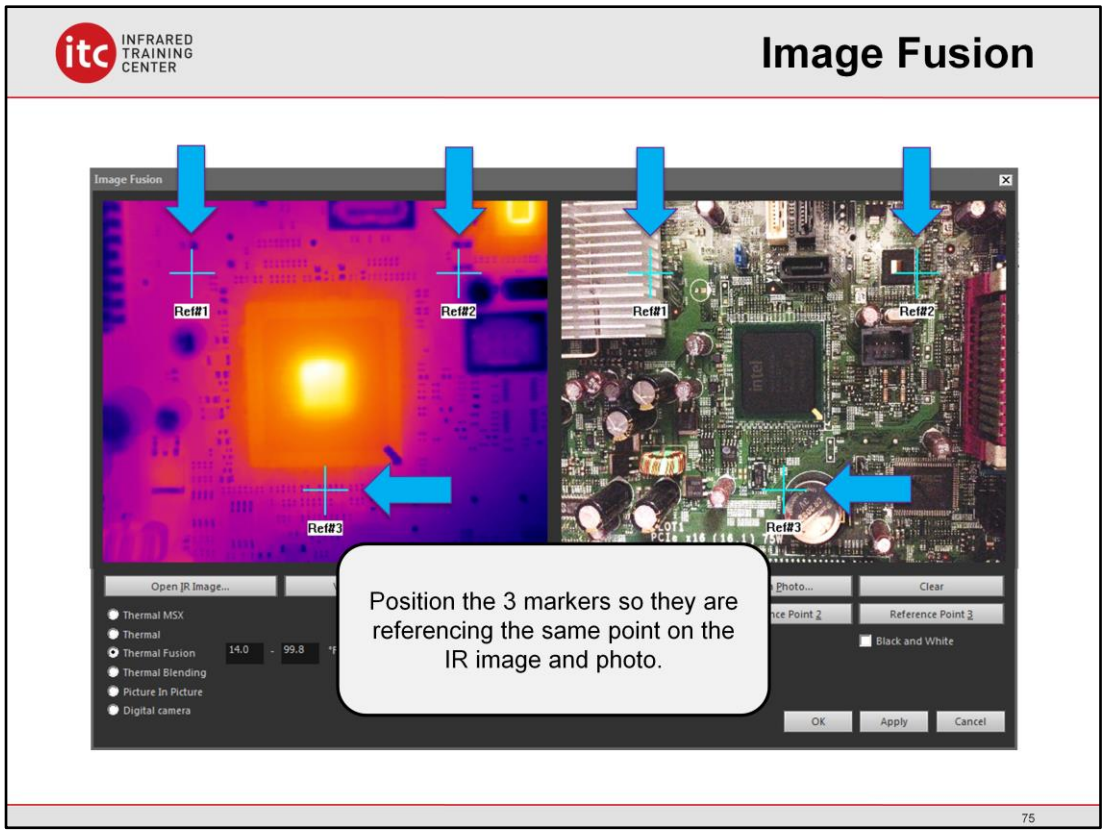


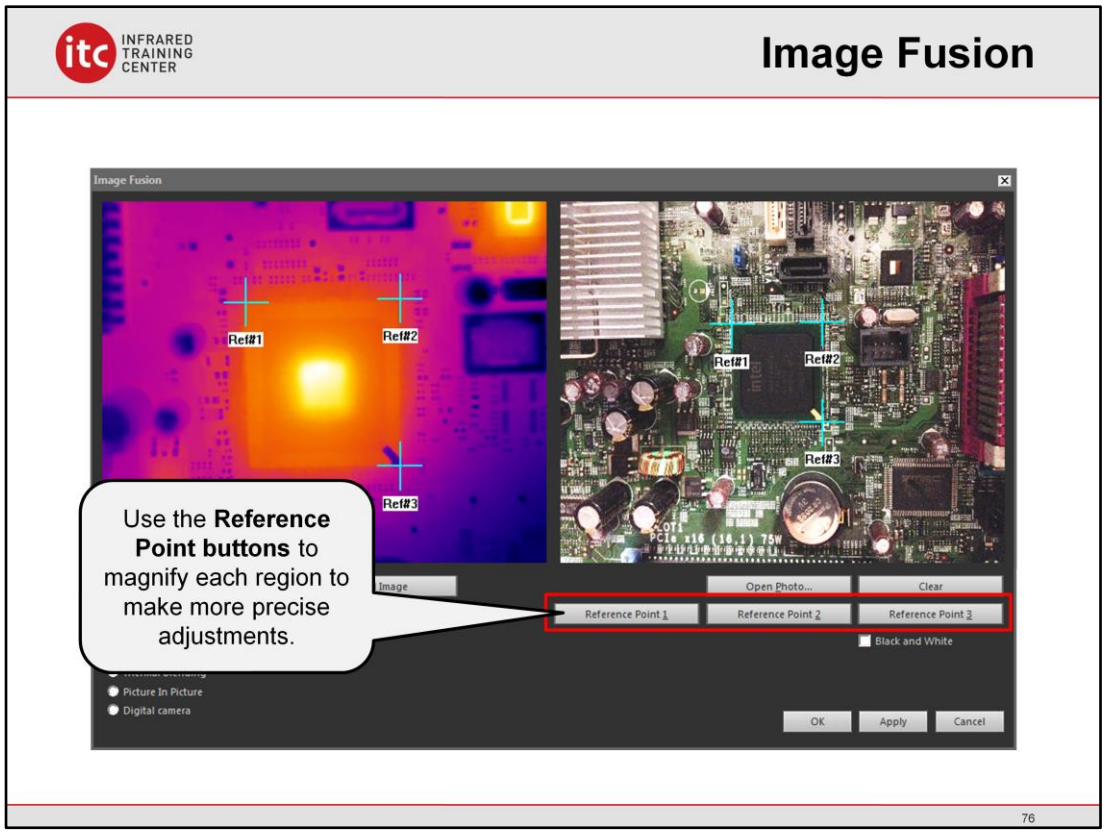
Image Fusion allows you to merge an IR image with a matching visual photo. For fusion to work you must identify 3 reference points in the IR image and visual photo. Thermal tuning can help tremendously in selecting the best reference points. By adjusting the level and span, and by using a high-contrast color palette, you can draw out parts of the image that are easy to see in the photo but have a small thermal contrast in the IR image.

Click the **Image Fusion** button to begin the process of aligning the images.

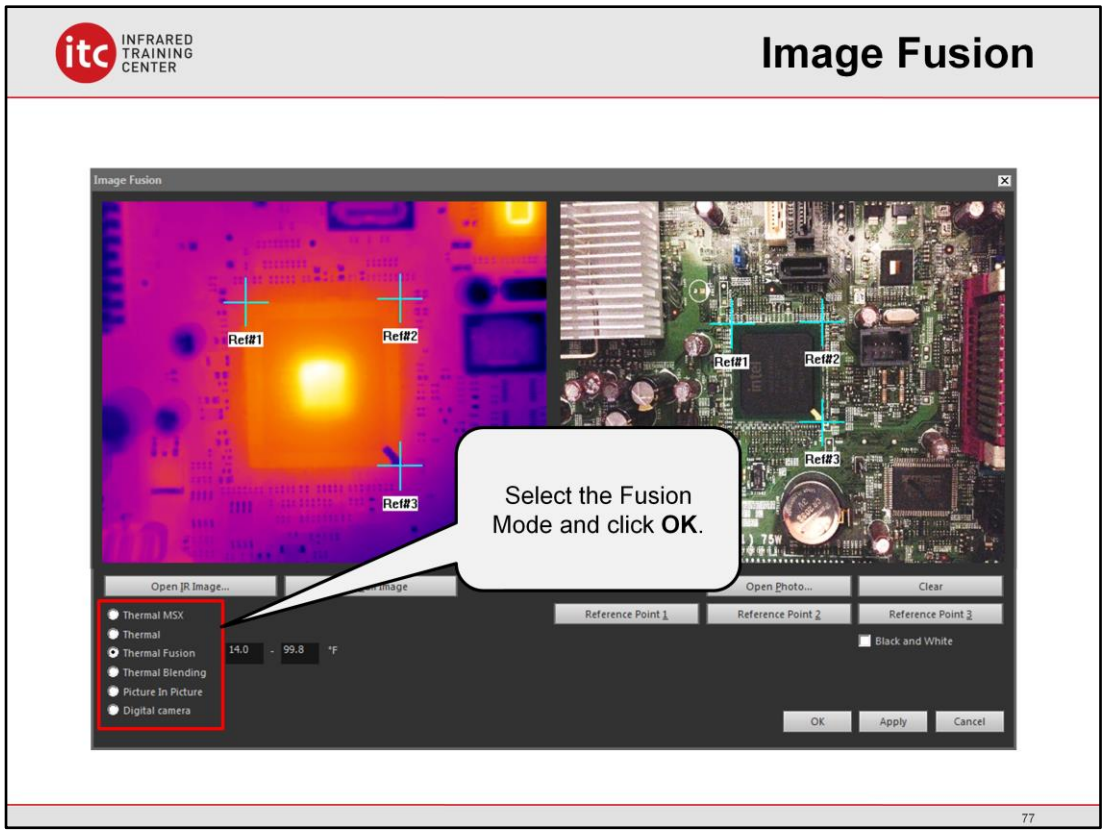


A matching photo will automatically open if one exists in the source folder. Otherwise click the **Open Photo** button to select the matching photo. It is not necessary to use a visual photo from a FLIR camera, however if your camera has this ability it is strongly recommended.

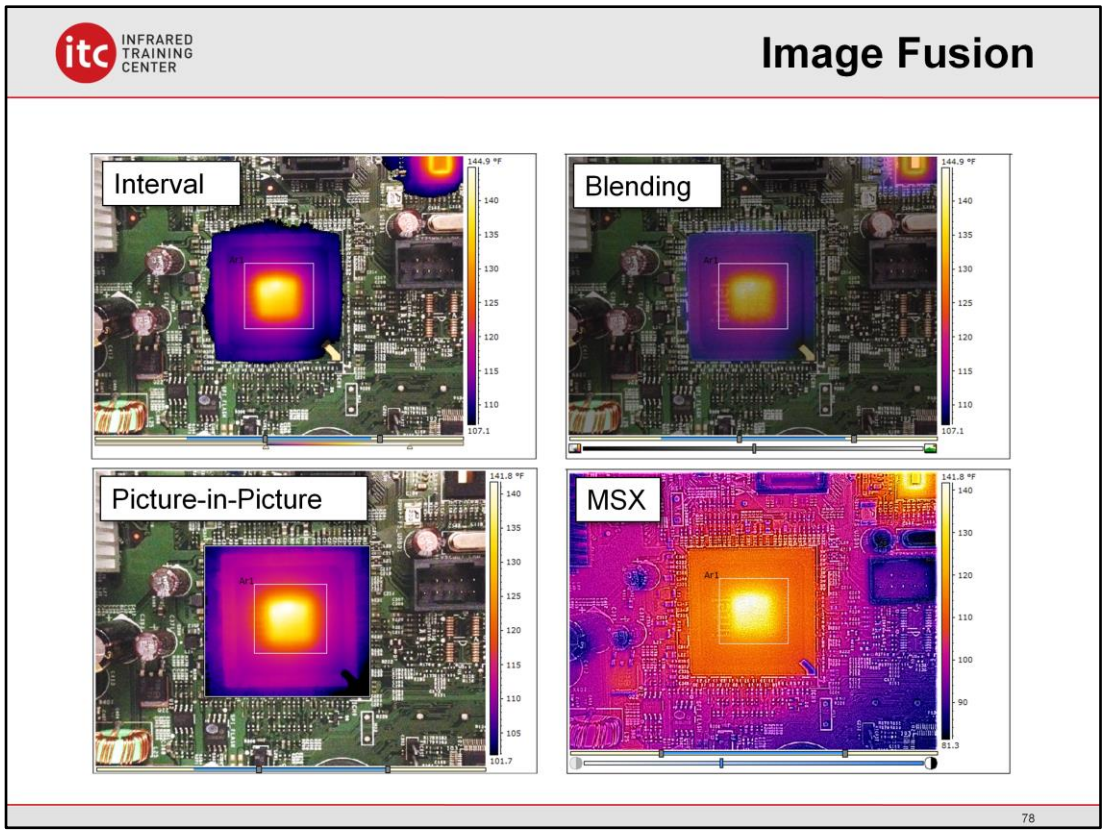
There are 3 reference points on each image. **Click and drag** on each reference point until it is in approximately the same position on the IR image and photo.



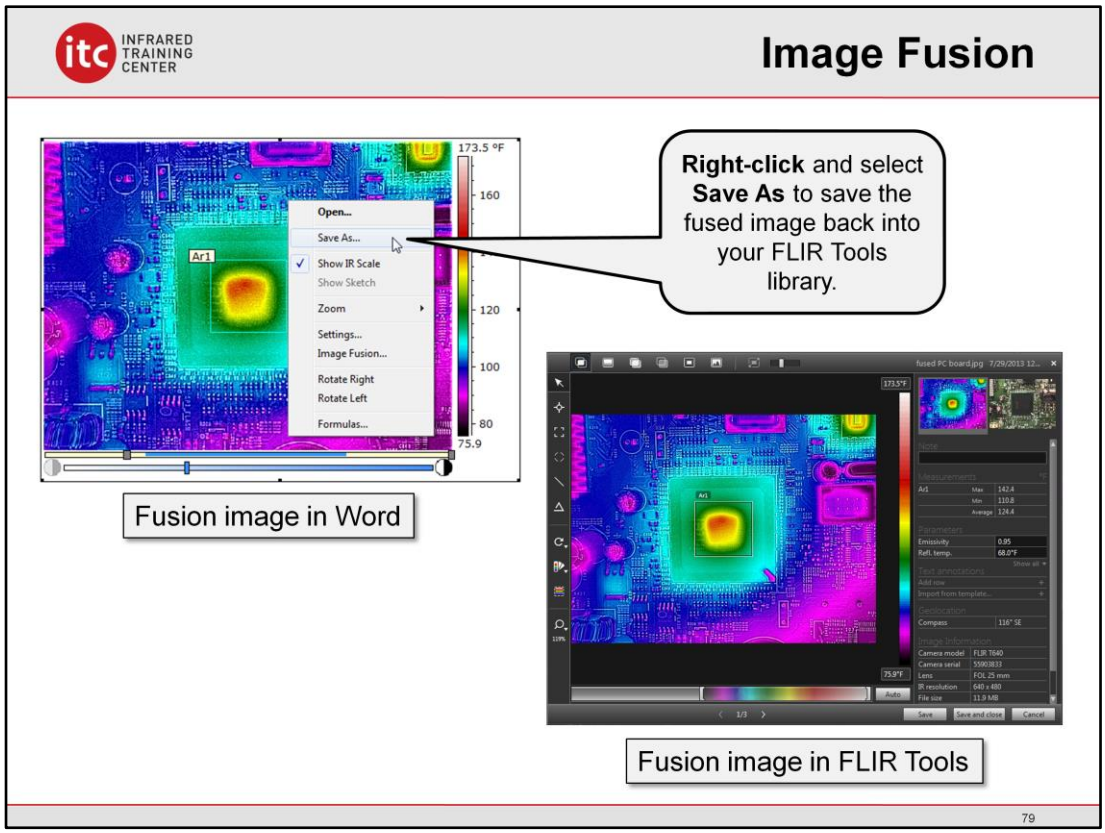
Click on each Reference Point button to magnify each region. This allows you to more precisely position the markers.



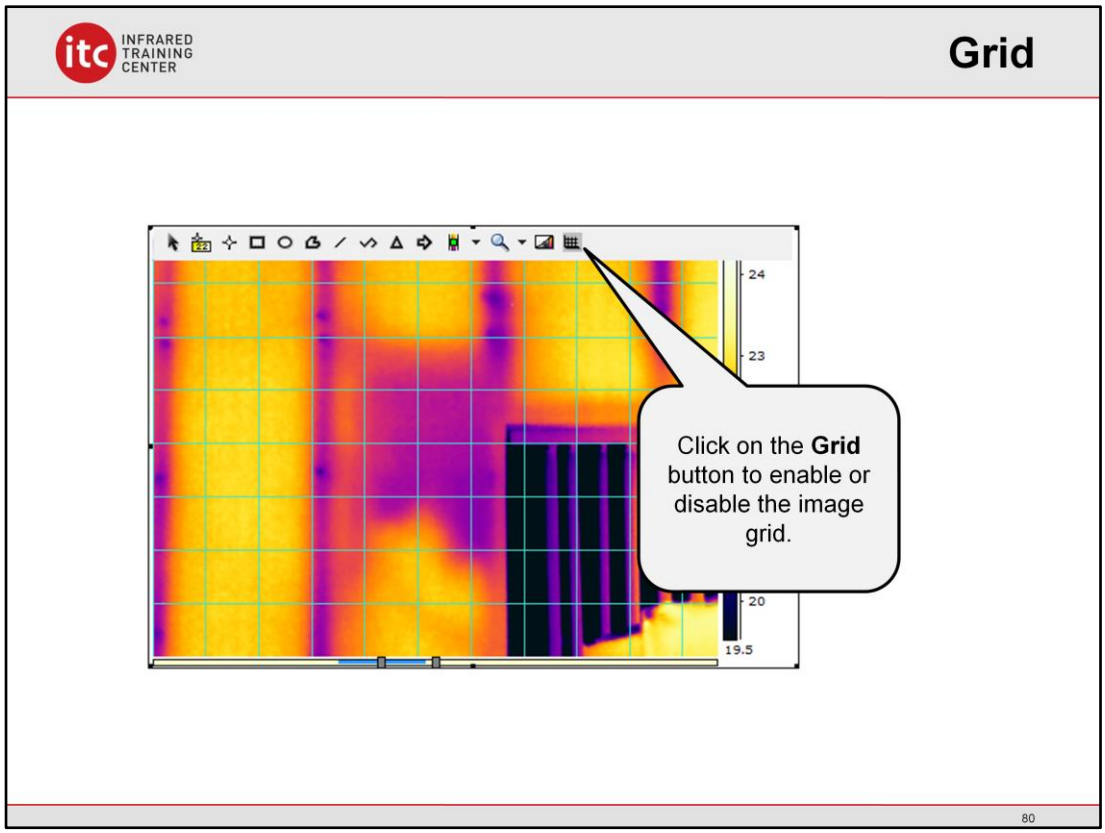
Select the desired Fusion Mode and click OK to blend the images.



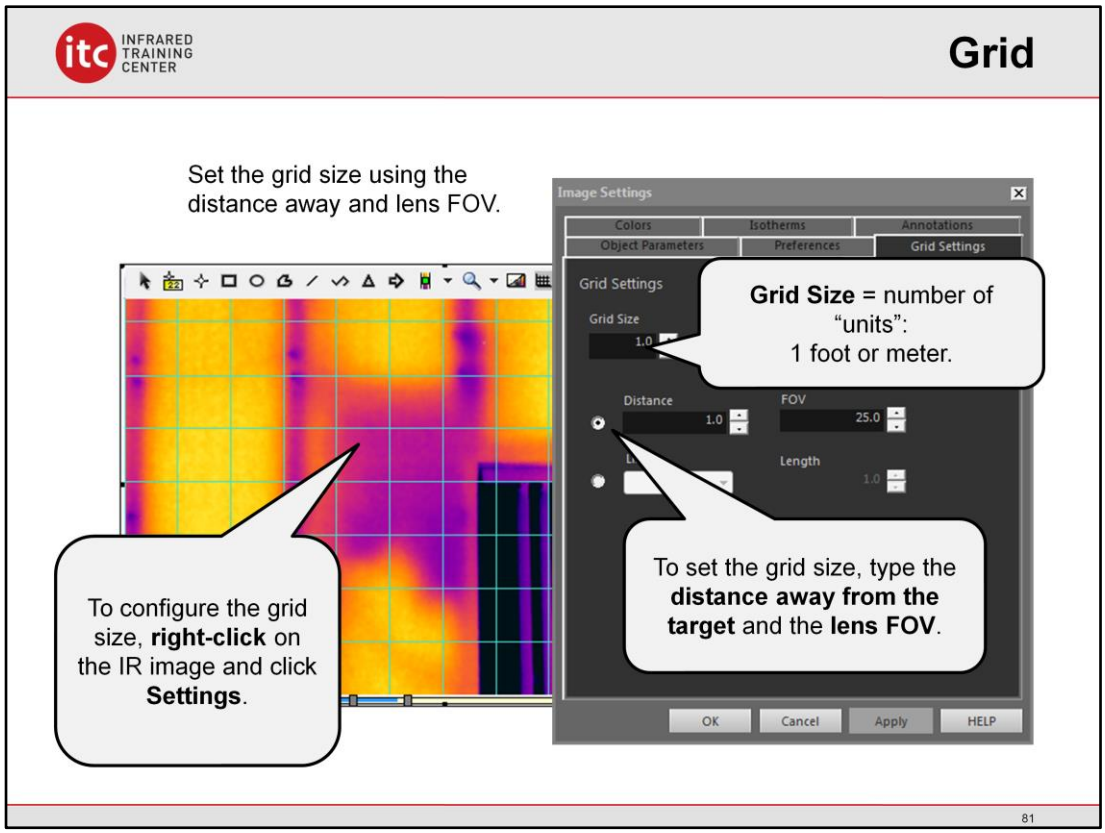
This shows the same fused images in each Fusion mode. You can click on the Fusion button on the Measurement Toolbar to change modes at any time.



On the report page, you can right-click on the fused image and click Save As to save the image to your FLIR Tools library. This allows to you edit the image using FLIR Tools. The image mode buttons will appear just as if it was saved from a camera with MSX, thermal fusion, or picture-in-picture.



The Grid can be used as a way to calibrate the image based on the distance away and the lens field-of-view, or by using the known length of a line.

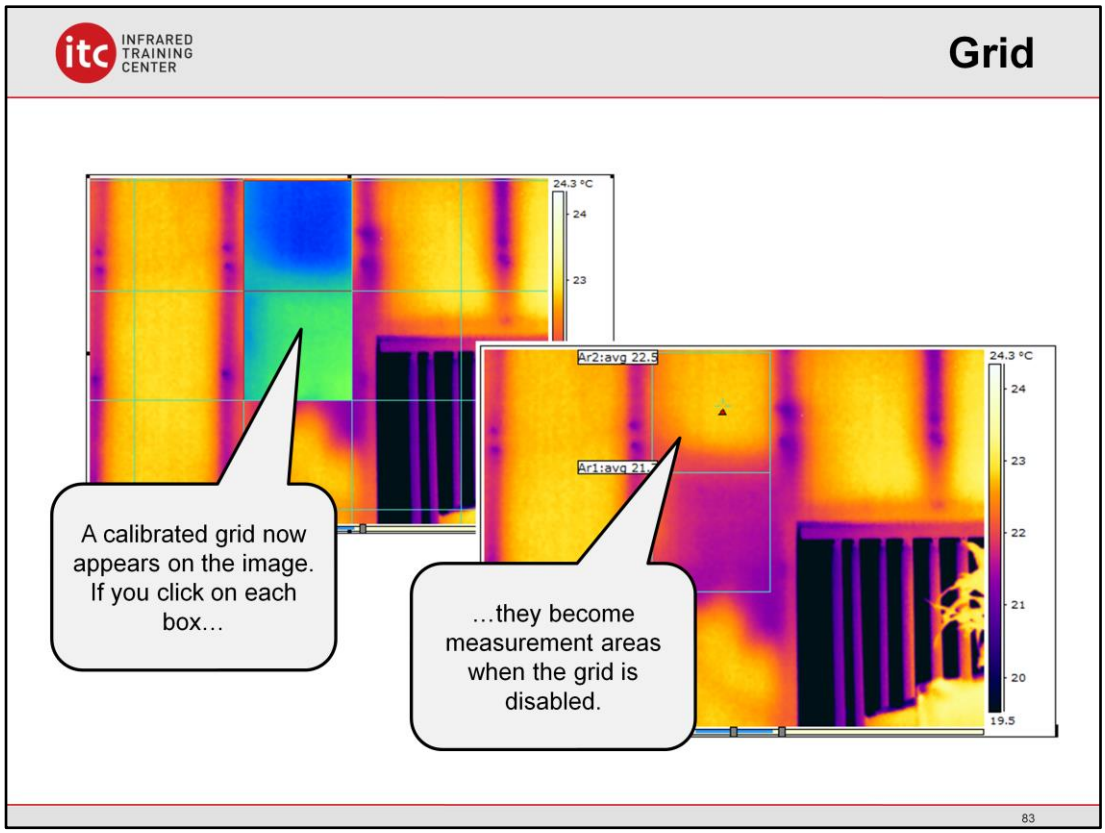


To access the Grid Settings: **right-click** on the IR image, click **Settings**, then click the **Grid Settings** tab.

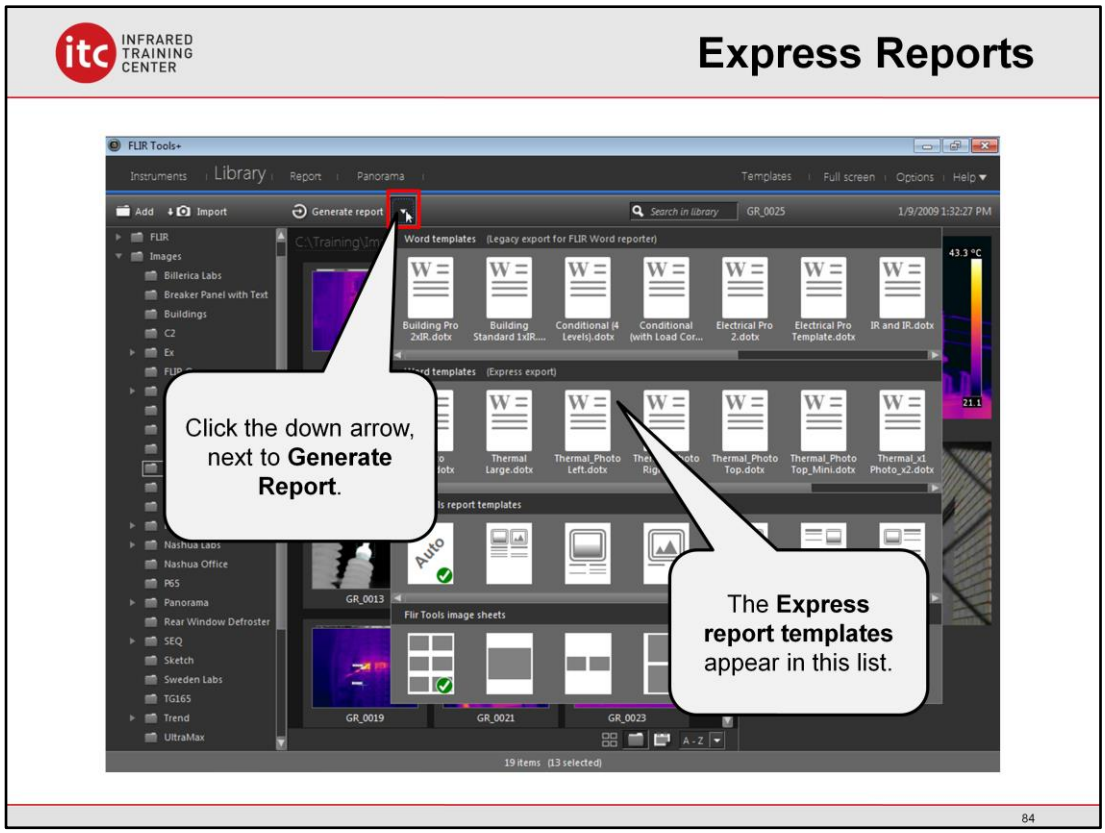
The Grid Size is the number of "square units" for each grid box. For example, a Grid Size of 1 would configure each grid box to be 1x1 feet or meters.

The Distance setting is the distance away from the target (in feet or meters). The FOV is the lens field-of-view.

You can also draw a line of a known length, and use this to calibrate the grid.

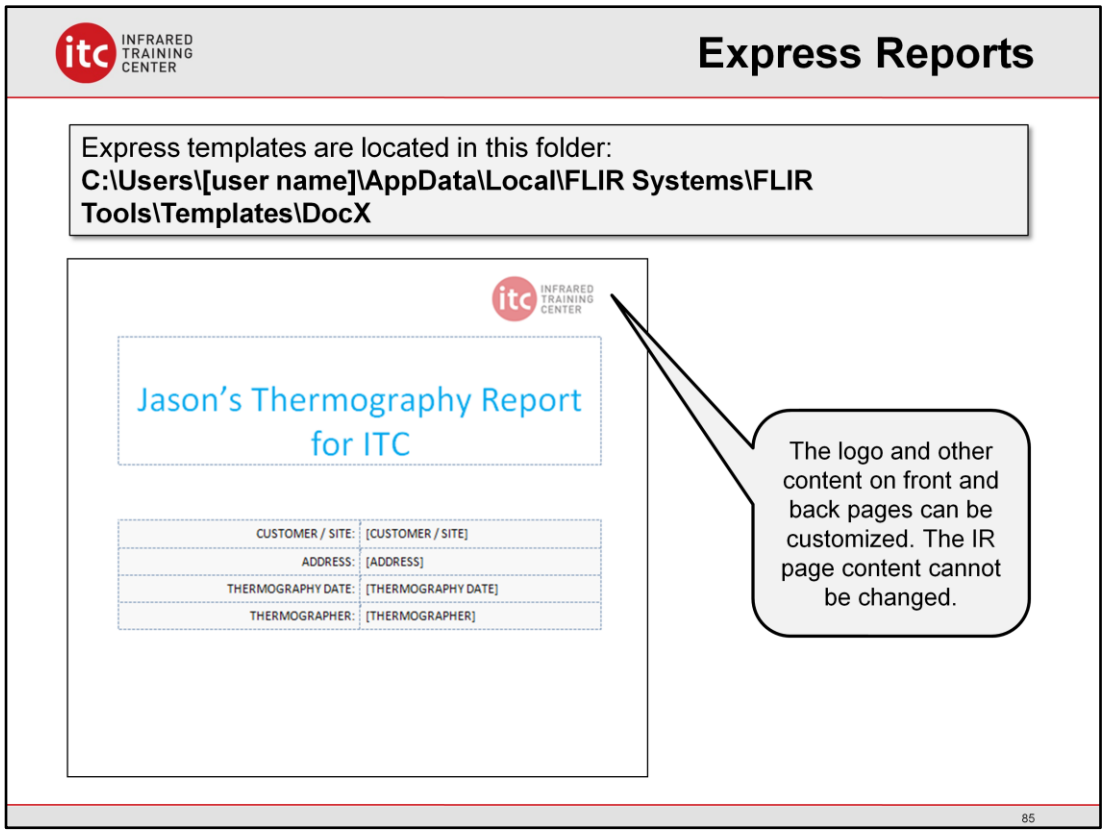


Once configured a calibrated grid will appear on the image, each box represents an area of 1x1 units. If you click on the grid boxes they become measurement areas once the grid is disabled.

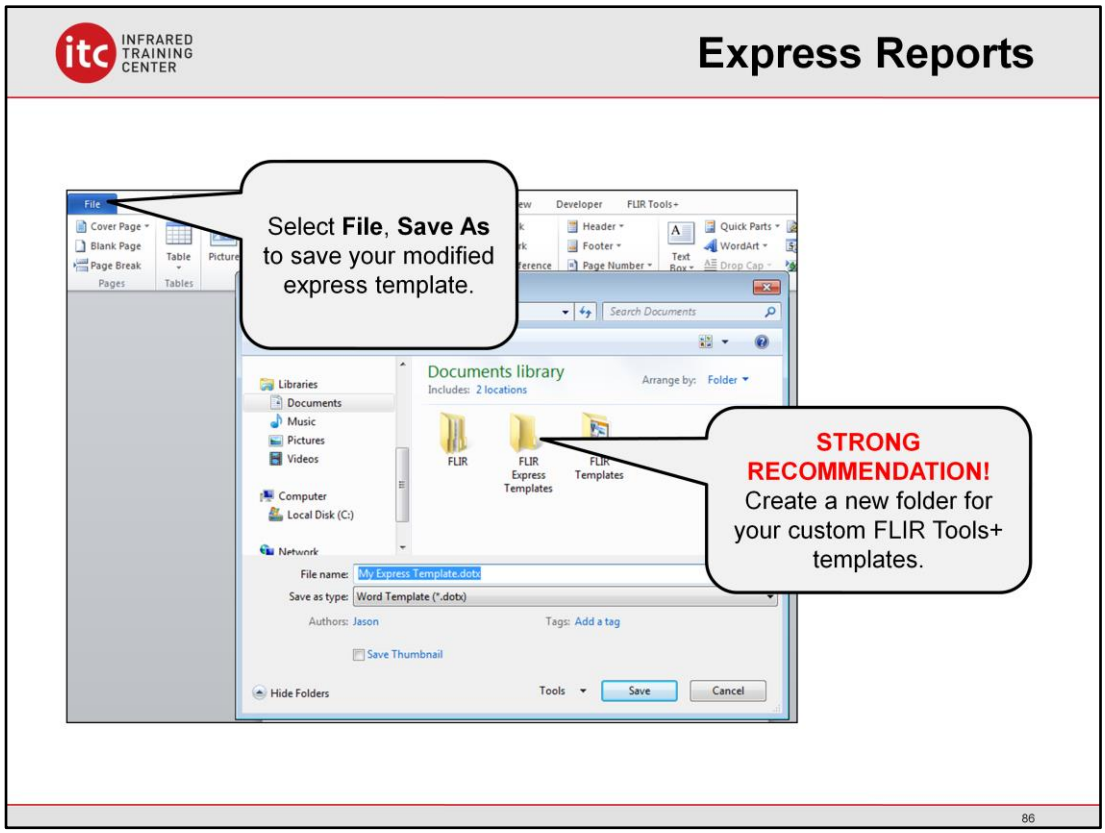


Express report templates provide the user with the ability to create very large reports, with potentially hundreds of images. This exceeds the limitations imposed by the legacy templates.

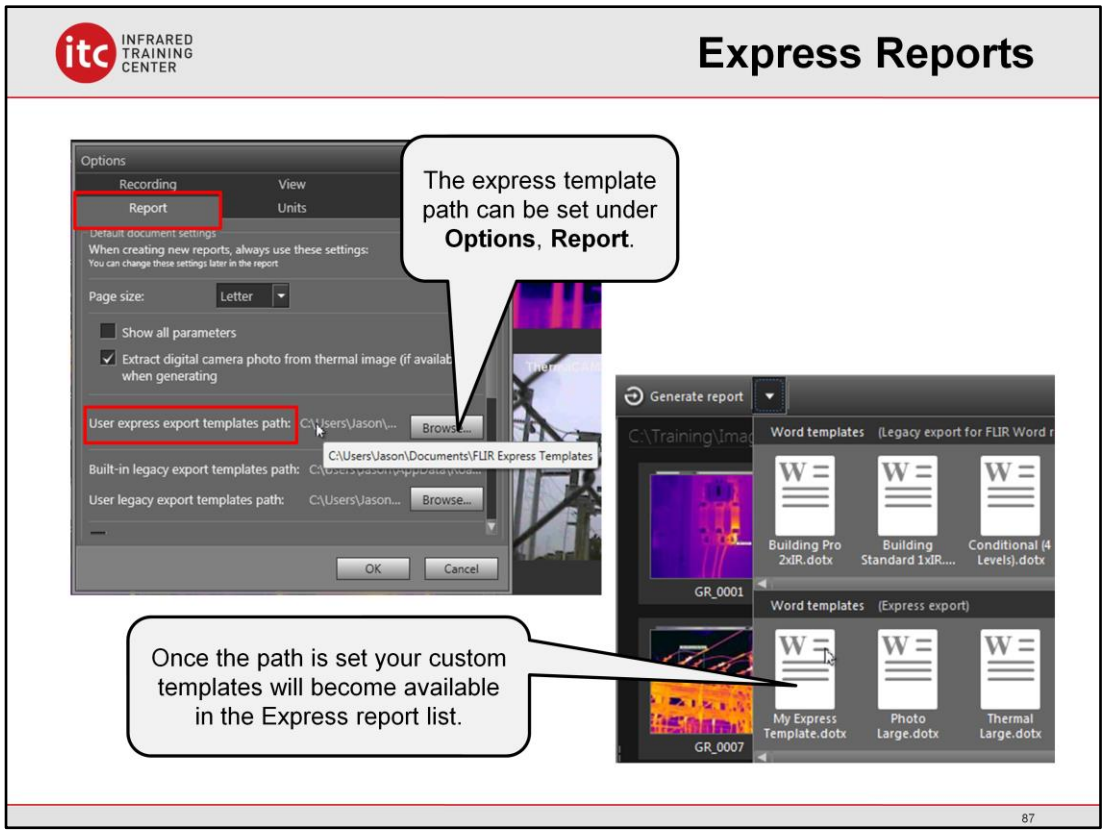
To create an express report simply select some image groups from your image library and click on the desired express report template.



Certain aspects of the express templates can be customized, such as cover and back pages. The IR page content cannot be edited.

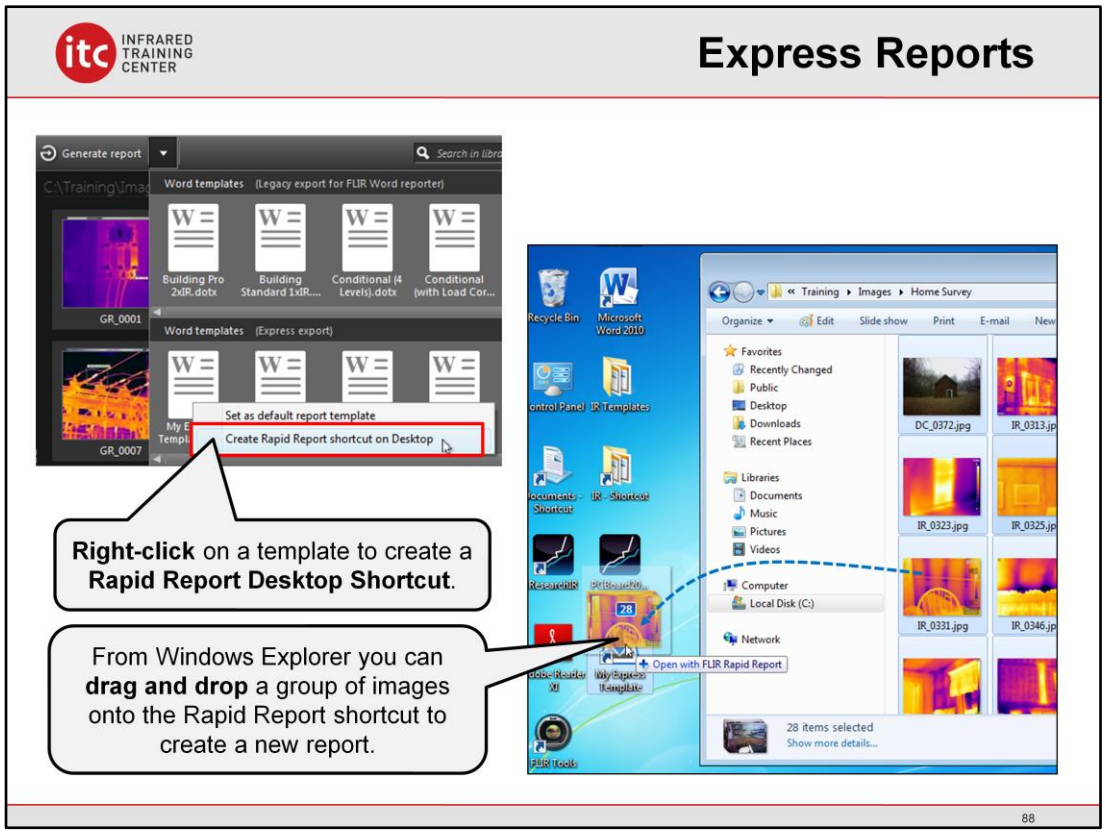


The template can be saved to any folder as a new Word DOTX template. The custom template path can be set in FLIR Tools.



To set the custom report path, click **Options**, then **Report** in FLIR Tools. Click Browse next to “User express export templates path” and point this to your custom template folder.

Once the path is set your custom templates become available in the express report template list.



The **Rapid Report** option allows you to create a shortcut on your Desktop for creating new reports. This allows you to drag and drop a group of images from Windows Explorer onto the shortcut without needing to start FLIR Tools. Word will automatically open when the new report is created.

Support and Training

- For FLIR technical support, downloads and other resources please visit http://support.flir.com
- For more information about training please visit http://www.infraredtraining.com. Here you can find a complete list of certification courses, on-demand courses, webinars, and community forums.

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