FLYABILITY

INSPECTOR

USER MANUAL

VERSION 2.2
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1 Overview and setup

Inspector is the offical Flyability software used to analyze the inspection footage gathered by the ELIOS 1 and ELIOS 2 drones.

Flyability drones save the flight data in different locations.

- The videos and still images are saved on the CAM SD card. A new video is created every flight, and when filming in 4K video, several videos can be created for one flight.
- The thermal camera data and flight altitude/direction are saved on the LOG SD card. A log file is created when a battery is connected, and continues recording until it is disconnected.

Inspector automatically matches log files to their corresponding videos, splices the videos for one flight, and allows for easy frame by frame video analysis and reporting.

1.1 First-time installation

1.1.1 System requirements

Inspector requires a 64-bit or 32-bit machine running Windows 7 or newer.

1.1.2 Get the application

The application is distributed as a standard executable installer (.exe), available on flyability.com.

1.1.3 Install the application

Run the installer and follow the instruction displayed. If a previous version of Inspector is already installed, the installer will uninstall the latter before installing the new one. Using the software requires no licence or activation.

1.2 Updating an already installed application

Updates to an already installed application can be done in two different ways.

1.2.1 Internet update process

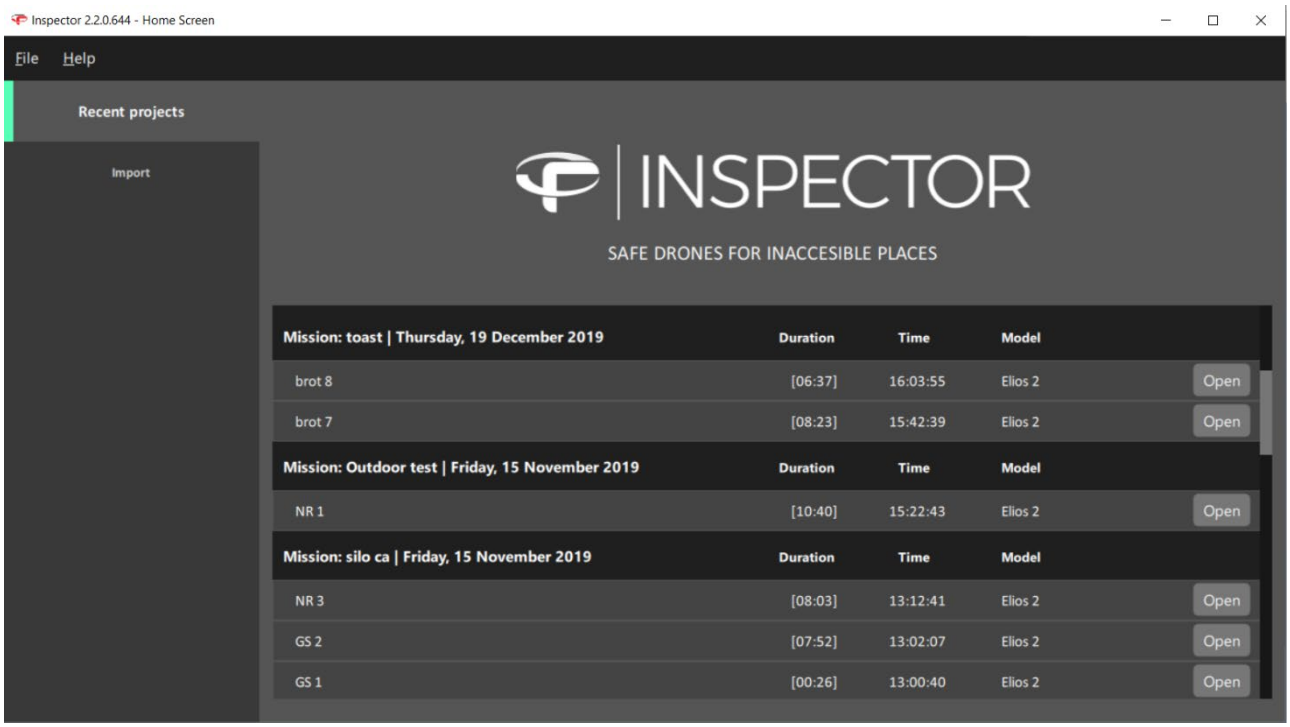
Be sure your computer has Internet access. As you start Inspector, the availability of updates is checked.

Should a more recent version be available, you will be notified and prompted to proceed with the update or decline it. If you proceed, the installation of the newer version begins automatically.

1.2.2 Manual update

The old version can also be uninstalled manually after which the new version can be installed.

2 Home screen



OPEN RECENT PROJECT

Open an existing .efly project and load the corresponding video and LOG file.
An existing project can also be opened directly by double clicking the .efly file in its save location, provided that the corresponding video and log files are in the same folder.

IMPORT

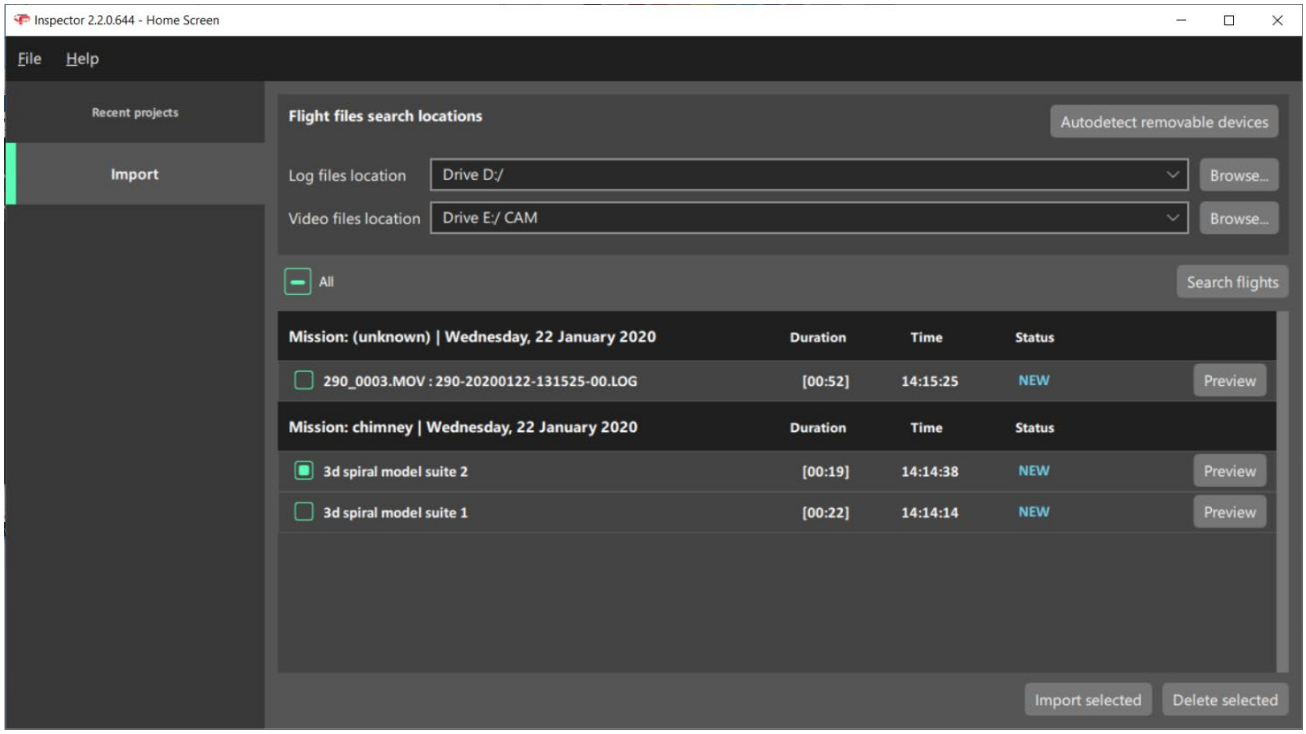
List all the flights from a directory, SD cards, or a connected Elios 2 drone. Inspector can automatically match videos and LOG files. They can be played directly or imported and saved locally.

3 Import data and create a new project

There are two ways to create a new inspection project. Manually matching the video and the LOG file, or use the matching feature to scan for videos and LOGs to pair them.

3.1 Scan directories and import

By clicking the import tab in the home screen or by connecting an ELIOS 2 to your computer via USB, Inspector will open the import menu.



For Elios 1, remove the SD cards from the drone and plug them into you computer.

The auto-importer can either scan a given folder, SD cards connected to the computer, as well as an ELIOS 2 aircraft. By clicking on “Autodetect removable devices”, Inspector will check if an ELIOS 2 or if LOGs and CAM SD cards are connected to the computer. Should this fail you can also select a location manually using the “Browse” button.

By clicking “Search flights”, the auto-importer will scan the provided directories and list all the flights; A flight is composed of video files and its corresponding telemetry LOG file.

From the import window, it is possible to select any number of flights and preview, import or delete them from the source directories.

IMPORT SELECTED

All the flight’s files are copied to a specified destination folder. These files consist of:

- All optical video files
- All still images created when making POI’s (Elios2 only)
- The log file
- The .THM thermal camera data file
- A thermal video .mp4 file (created the first time the project is opened in Inspector)

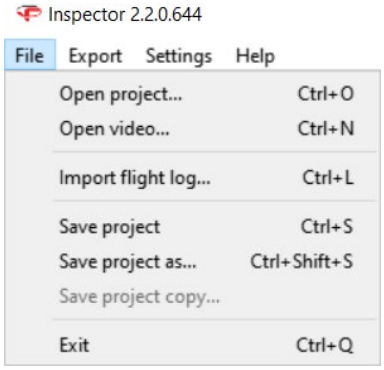
DELETE SELECTED

The flight's files are deleted from the source.
WARNING: THIS CAN NOT BE UNDONE, DOUBLE CHECK THAT THE IMPORT WAS SUCCESSFUL BEFORE DELETING FILES.

PREVIEW

If the flight was previously imported, then flight will be opened from the destination folder. If not, it will be played from the source.

3.2 Matching files manually



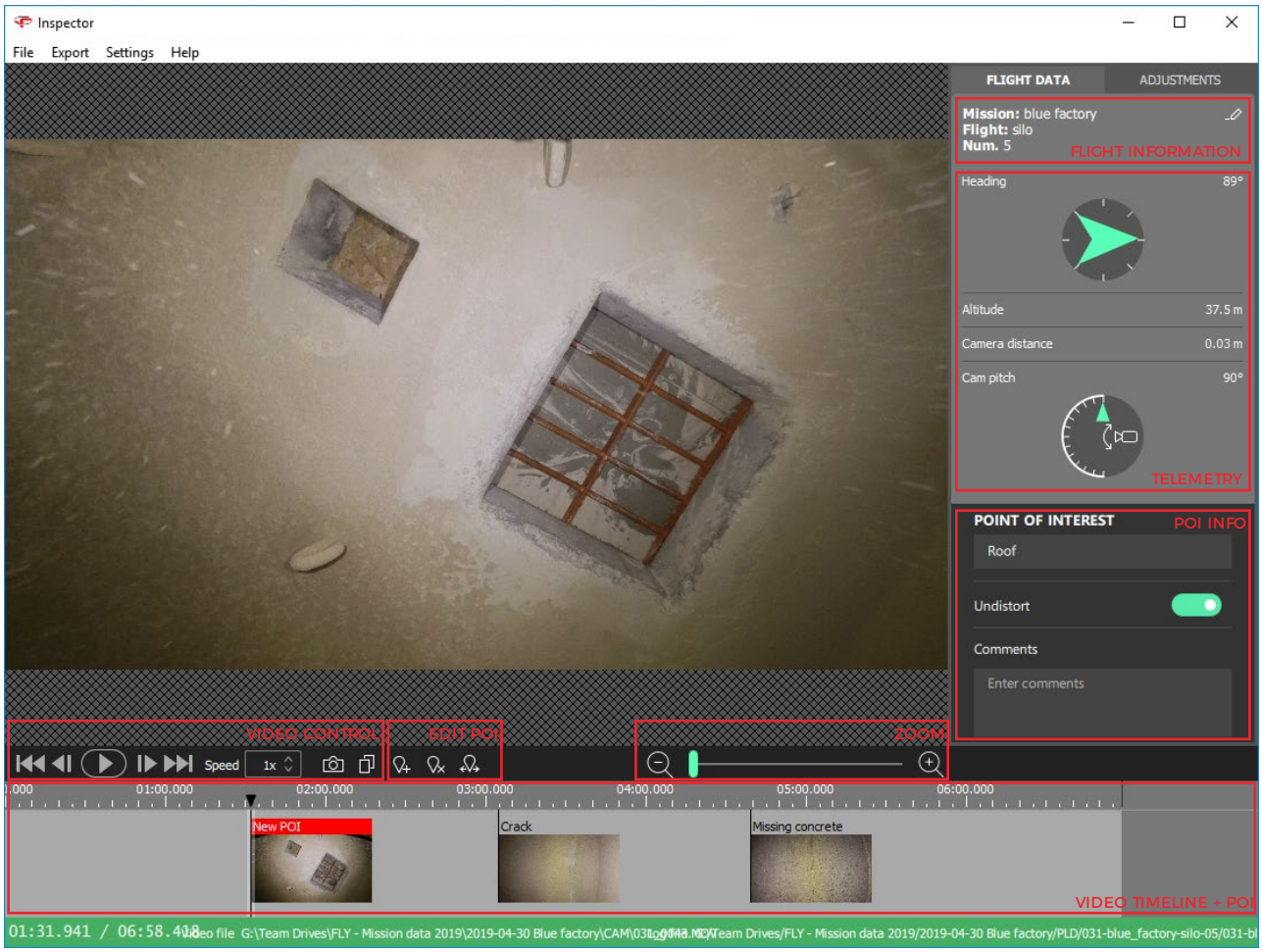
By clicking on "Import video (Ctrl+L)", Inspector will load the video. To add telemetry data, click on "File > Import flight log (Ctrl+L)".

3.3 Save a project

Once a project is created, it is possible to save it by clicking on "File > Save project (Ctrl+S)" or "File > Save project as... (Ctrl+Shift+S). Saving the project will create an .efly project file linking flight's file together for later use.

4 Analysis

Once a flight is opened, the inspection interface is displayed.

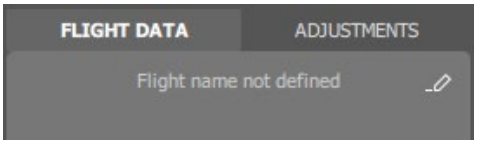


4.1 Flight information

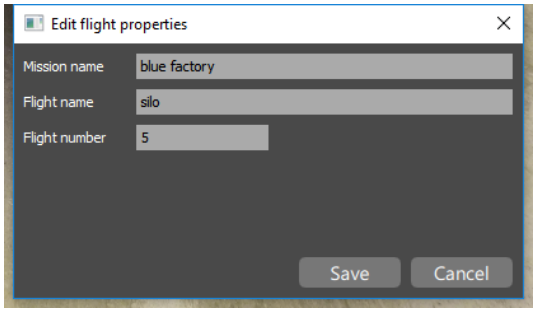
If this was inserted into Cockpit before the flight, Inspector will displaythe flight information:

- Mission name (on the picture blue factory)
- Flight name (on the picture silo)
- Flight number (on the picture 5)

If no flight information was filled in Cockpit, it will be displayed as not defined.



Clicking on edit allows to add or edit the flight information.

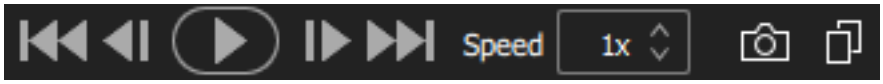


4.2 Telemetry

If the LOG file corresponding to the video was found, Inspector can display the drone telemetry. It contains the following information:

- Heading
- Altitude
- Camera distance, the distance between the camera and the surface.
- Camera pitch

4.3 Video control



play or pause the video (Space bar)

move to the previous / next frame (arrow left/right)

move to the beginning / end of the flight

set the playback speed

Extract current frame

Place the current frame in the clipboard to be pasted elsewhere (Ctrl+C)

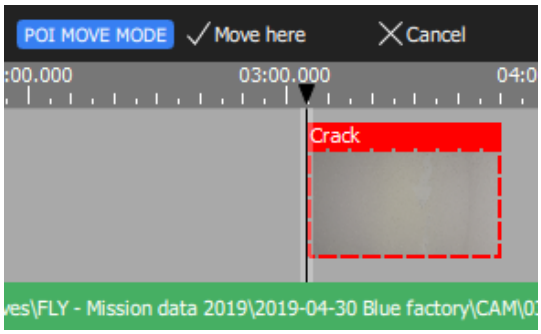
4.4 Point of interest (POI)

Create a POI with the current frame. This action can also be performed with (N)

Remove the selected POI. This action can also be performed with (X)

Move the selected POI. This action can also be performed with (M)

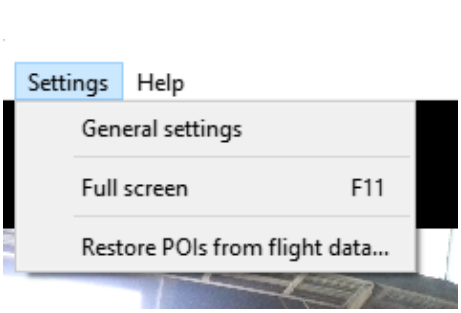
4.5 Move a POI

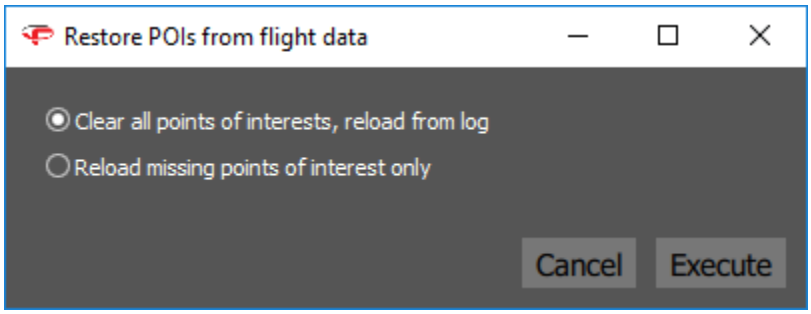


To adjust the time of a point of interest:

- Select the point of interest
- Click the Move button from the toolbar or press M
- Inspector is now in move mode. In this mode, the toolbar changes.
- Seek to the actual time where you want to reposition your point of interest. You can choose the new location with the keyboard arrow, the next/previous frame button, or by clicking on the timeline. You cannot reposition it over another existing Point of interest.
- To validate, click “Move here” or press Enter.
- To cancel the operation, click “Cancel” or press Esc.

4.6 Restore orignal POIs





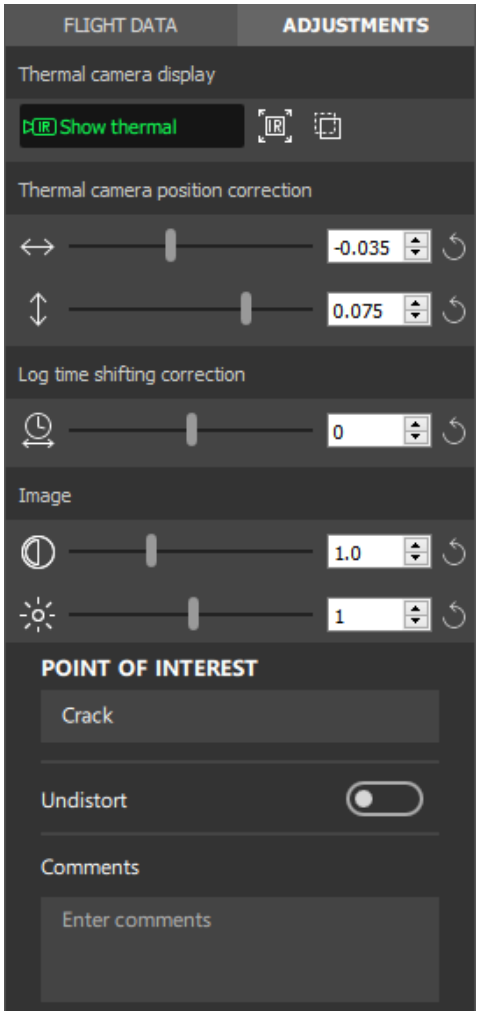
To restore points of interest from log files:

- From the menu, use “File > Restore POIs from flight data…”
- A dialog box appears to let you choose the restoration strategy.
- Select “Clear all points of interests” to clear the entire timeline and restore original Points of interest from the log file
- Select “Reload missing points” to preserve manually added points of interest and restore missing ones only. The absence of a point of interest at its original time is enough to consider it as missing.
- Click Execute to apply the changes.

4.7 POI information

When a POI is selected, it is possible to edit its name and add comments. Those inputs will be used while exporting a report from the flight.

4.8 Adjust image



4.9 Thermal camera

Enables or disables thermal image overlay on top of the visible image

Full-screen thermal image

Thermal overlay transparency.
This feature works on systems with Windows 8 or higher.

Horizontal shift of thermal image overlay

Vertical shift of thermal image overlay

Adjustment of the time difference between video and information from LOGs, including thermal imagery. It is used to compensate for an eventual lack of synchronization between camera and flight recorder.

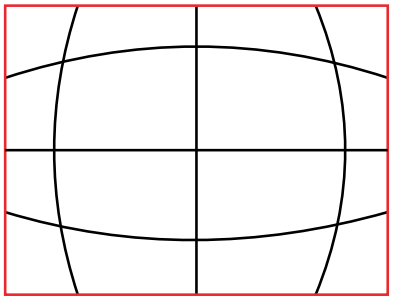
4.10 Optical camera

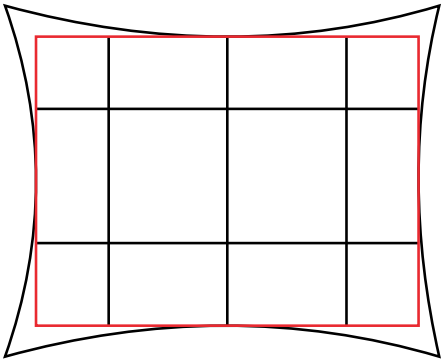
Main image contrast

Main image brightness

Any setting can be brought back to its default value by clicking the Reset button on the right

4.11 Undistort





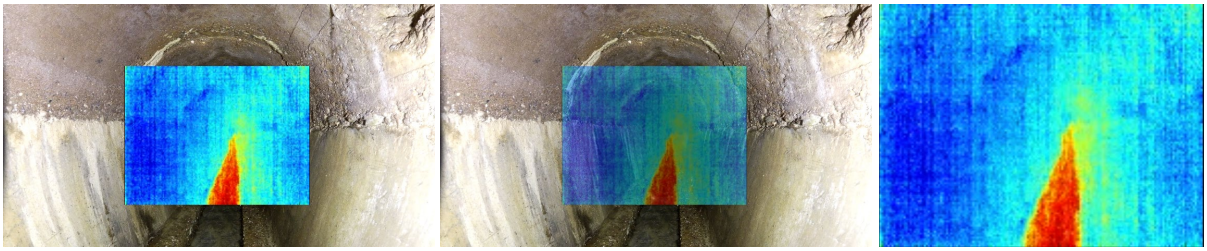
ORIGINAL IMAGE – DISTORDED

UNDISTORDED

Border of displayed imaged

Due to the fish-eye nature of the optical camera, the image is distorted. Meaning, the straight lines are bent. In a POI, the image can be undistort or flatten. As the transformation stretches the image, the resulting frame displayed is slightly cropped.

4.12 Thermal camera



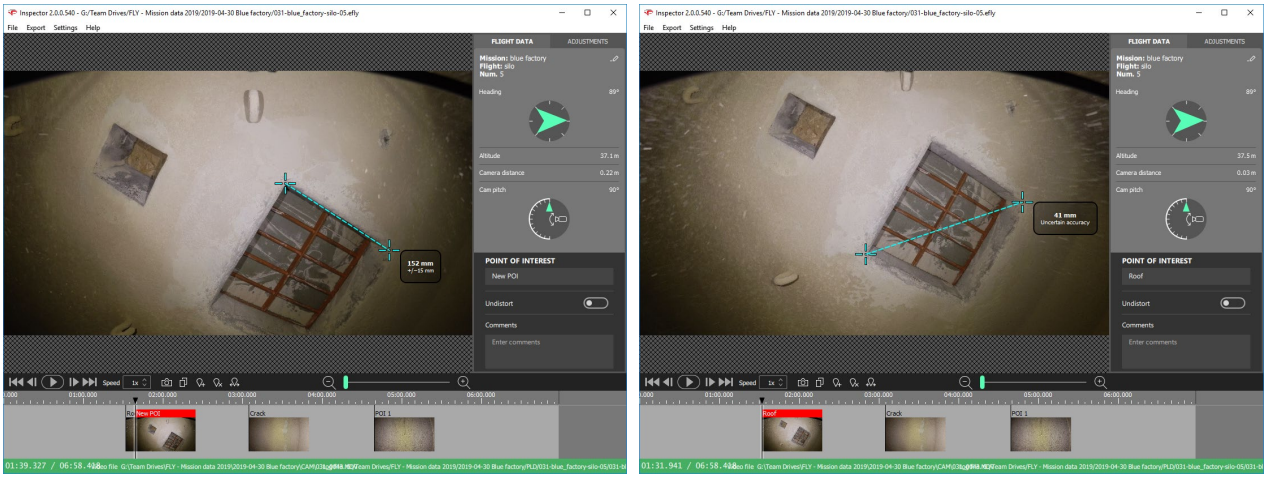
The thermal camera can be displayed in three different ways:

- Overlay
- Transparent overlay. This feature works on systems with Windows 8 or higher.
- Full screen

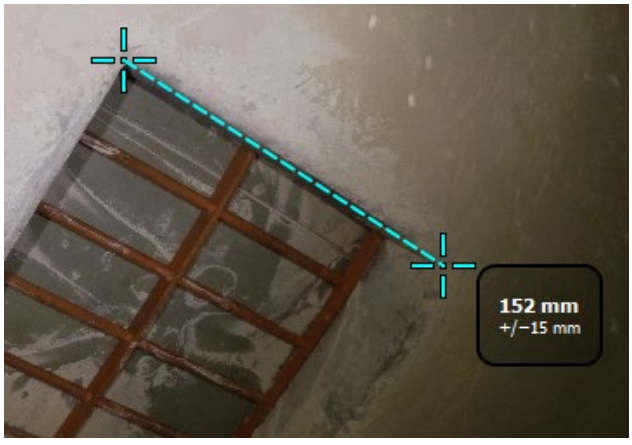
4.13 Camera distance

The telemetry displays the distance measured by the Camera distance sensor. This value can be used to assess the distance from the drone to the surface located in front. This value is only measured on Elios 2.

4.14 2D measurement



- Create or edit a POI
- Click on the frame where to place the first crosshair
- Click on the frame where to place the second crosshair
- To redo the 2D measurement click on the image and repeat those steps



The 2D measurement result is displayed on the frame with its estimated accuracy.

If the 2D measurement is not available due to missing or unreliable Camera distance data, Inspector is issuing the warning “Unable to perform 2D measurement on this frame”.

This feature is only available with data from Elios 2.

THE USER MUST ASSESS IF THE MEASUREMENT MAKES SENSE BY UNDERSTANDING ITS LIMITATIONS AS DESCRIBED IN THE CHAPTER 2D MEASUREMENT AND IF THE CAMERA DISTANCE MAKES SENSE.
FLYABILITY DOES NOT GUARANTEE ITS ACCURACY.

5 Export data

5.1 Export current frame

- Seek to the frame you want to export or click the point of interest.
- Click the camera button (export frame) on the toolbar
- Specify file to save in the file browser

Alternately, you can copy/paste the active frame:

- Seek to the desired frame
- Click the Copy button from the toolbar or press Ctrl+C
- Use the Paste feature of the software in which you want to export the frame or the system file browser

5.2 Export Inspection Report

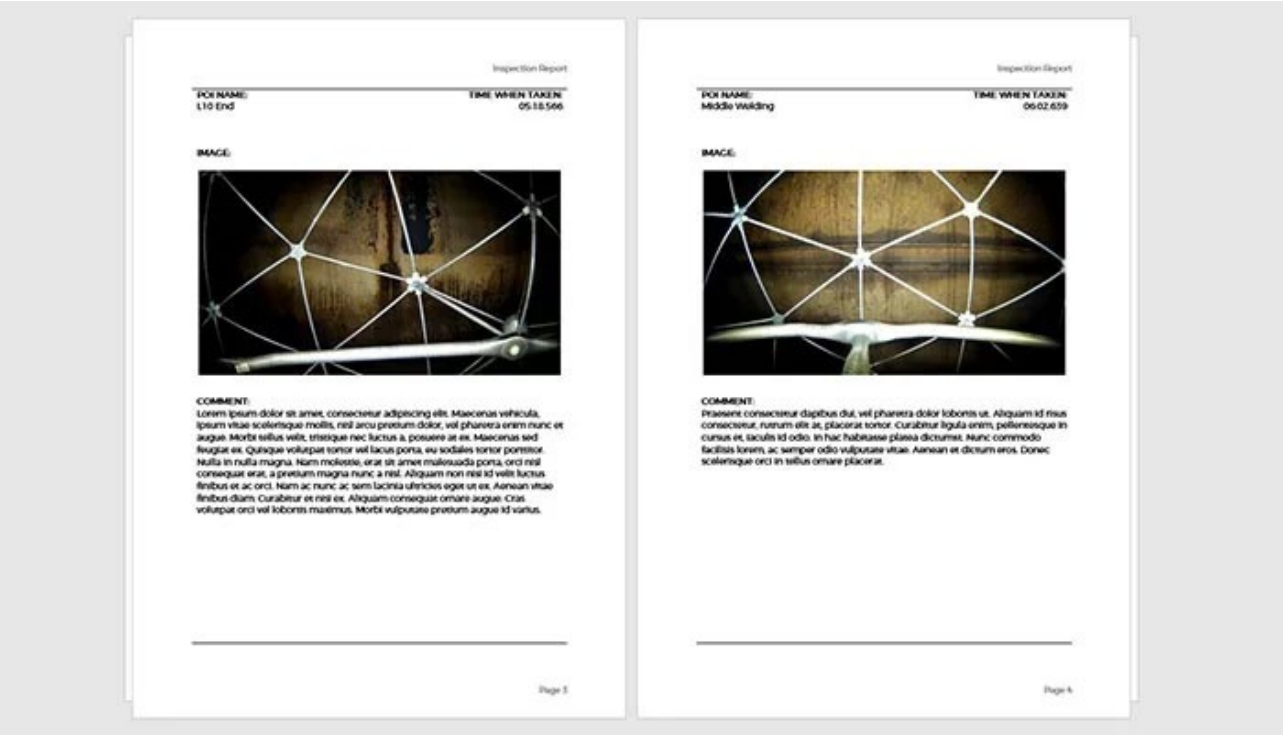
Inspector can generate a Microsoft Word document with detailed pages for each point of interest.

A report includes the following information:

- Cover page with flight properties
- One page per point of interest with image and properties of that point of interest

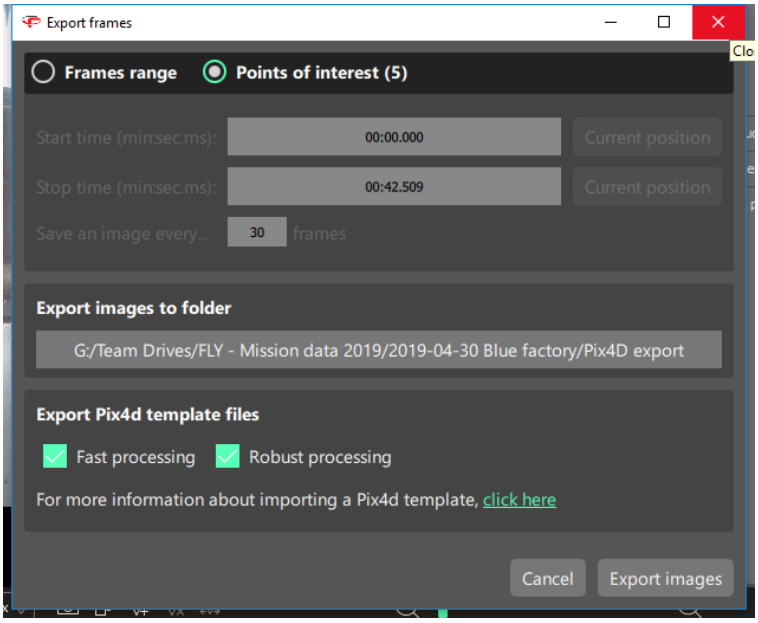
To export a Word report:

- From the menu, use “Export > Create inspection report…”
- Specify the location at which the document should be saved using the file browser
- Wait for the operation to finish (should take a few seconds)



5.3 Export POIs

- Make sure your project has, at least, one point of interest set.
- From the menu, use Export > Export frames as images…

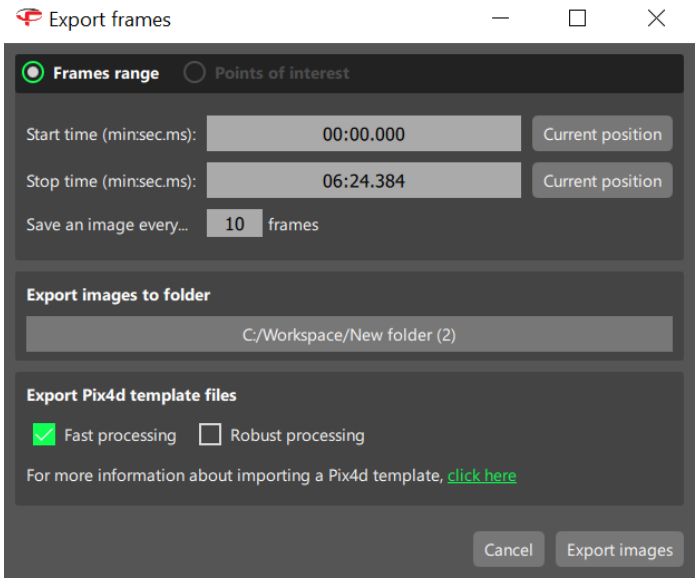


- In the export dialog, on the top selector, choose Points of interest
- Select the folder in which images should be exported using the file browser.
- Click Export images to process.
- Wait for the operation to complete

5.4 Export multiple frames – Photogrammetry with Pix4D

This setting can export frames at a constant frame rate over an entire range of the video. These frames can be used in photogrammetry software to reconstruct 3d models of the flight environment.

- From the menu, use “Export > Export frames as images…”



- In the export dialog, select Frames range.
- Select the start time in the main window and click “Current position”.
- Selects the stop time and click “Current position”.

- Set the desired frame export interval in Save an image every…frames
- Select the folder in which images should be exported using the file browser.
- If you desire to use Pix4D to create a photogrammetric model from the exported frames, the user can also export a Project template file with the correct processing parameters. Two settings are available:
    - Fast processing: Less robust, but fast.
    - Robust processing: Increased robustness. But the computation time drastically increases.
- Click “Export images“ to process.
- Wait for the operation to complete.

5.5 Export video file

This feature exports the video as it is displayed in the inspector video window: with thermal camera overlay and brightness/contrast adjustments.

- From the menu, use “Export> Export video file…”
- Specify the video file location using the file browser
- Click OK to start operation
- Wait for the operation to complete; it might take a few minutes

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