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I. INTRODUCTION

Daybook Analysis is primarily the companion software of Argolight hardware products. It allows to quickly and easily analyze images of the Argolight geometrical patterns acquired with a fluorescence microscope. Thanks to dedicated image analysis algorithms, Daybook Analysis provides quality data and performance metrics about the controlled microscope, organized in images, graphs and tables.

Besides, Daybook Analysis can also analyze images of non-Argolight products to provide the complementary quality data that are not accessible with Argolight hardware products.

Notably, Daybook Analysis meets almost all the guidelines of the recently published ISO 21073-2019 norm (<https://www.iso.org/standard/69820.html>), about performance assessment of fluorescence confocal laser-scanning microscopes for biological imaging.



II. STARTING PROCEDURE

When launching Daybook Analysis for the first time, the “Settings panel” appears (cf. Figure 1).

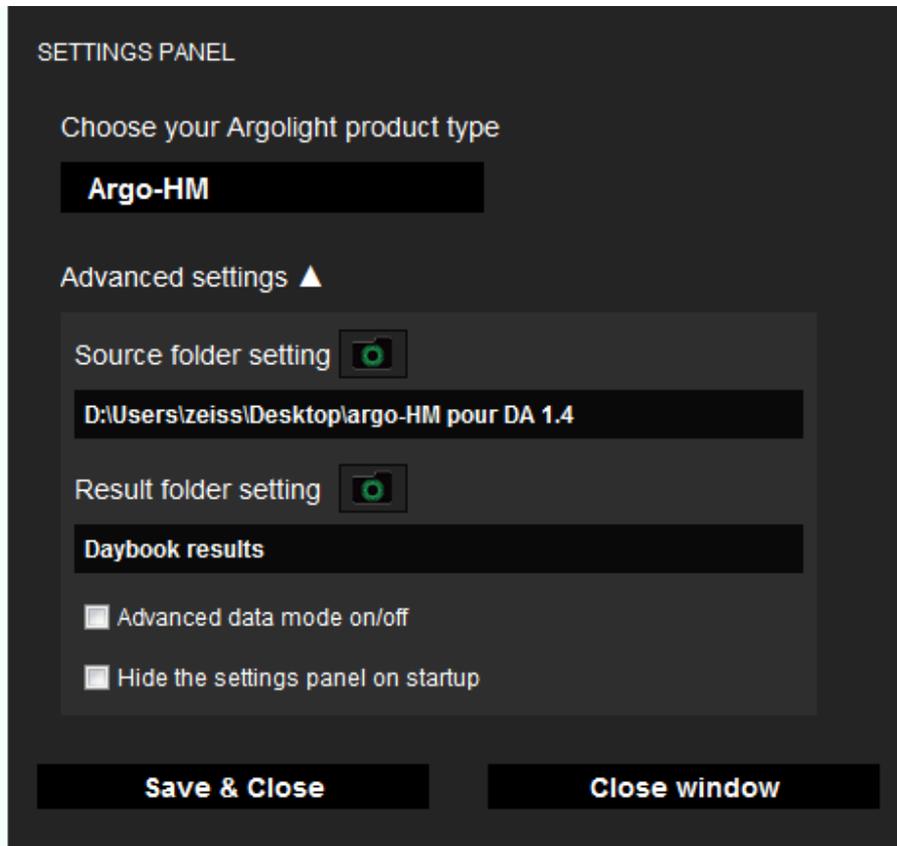


Figure 1: Settings panel, with the “Advanced settings” displayed.

Is possible to come back to the settings panel at any time: click on the “Settings” button in the menu at the bottom left-hand corner.

Choose your product type:

Enter the type of Argolight product you are using:

- Argo-POWER^{HM}
- Argo-HM
- Argo-LM
- Argo-SIM
- Argo-WP
- Argo-Check Resolution
- Argo-Check Intensity
- Argo-Check Homogeneity
- Argo-Z

Enter the type of non-Argolight product you are using:

- Point-like object



Prior generations of Argolight products (such as the Argo-M) are not compatible with Daybook Analysis.

Each type of product displays different patterns, that's why it is essential to select the correct type before running any analysis. Otherwise, the analysis would provide wrong results.

Advanced settings:

- Source folder setting:

Define the folder where the images to analyze are located.

- Result folder setting:

Define the folder where the results files (images, spreadsheets...) will be saved.

- Advanced data mode on/off:

Access to more images, such as raw images, and data in the saved results files. We advise not to check this option for routine usage.

- Hide the settings panel on startup:

Prevents the settings panel to appear each time Daybook Analysis starts.



III. ACCEPTED IMAGE FILES

Daybook Analysis can process up to 150 different image file formats, thanks to the integration of the well-known Bio-Formats library.

The list of the formats that can be read by the Bio-Formats library is available here:
<https://www.openmicroscopy.org/site/support/bio-formats5.5/supported-formats.html>.

Note: IMS files (from Andor Dragonfly systems) will open in the smallest resolution. It is recommended to save IMS files into OME.TIFF files, as this will retain some of the scaling information and metadata, while still being readable through Daybook Analysis.

Although 8-bits images are accepted, 16-bits images are recommended as they allow a more accurate processing.

32-bits images can be uploaded, but they cannot be analyzed.

Images containing negative values can be uploaded, but they cannot be analyzed. Use the options in the image acquisition software to either delete the negative values or apply an offset so that the lowest negative value in the image becomes 0 and all the other values are shifted accordingly.

Single color images can be uploaded, but they are converted into greyscale images.

Multicolor (RGB) images can be uploaded, but they are not suited to be analyzed.

Paths and names of the image source files can contain accents. Some special characters are not accepted.

Note: To prevent data losses, we do recommend saving the source images either:

- in a proprietary format (e.g. Leica LIF, Nikon ND2, Olympus OIR, Zeiss CZI, etc.),
- in a non-normalized or non-compressed format,
- in a lossless compression format (e.g. TIFF).

Do not save images in lossy compression formats such as JPEG. Indeed, this form of compression can alter the intensity data in the images in a non-linear fashion, leading to unpredictable biases in intensity measurements.



IV. UPLOAD IMAGES

Daybook Analysis can upload and store source images in order to re-use them from one session to the next one. To start an analysis session, click on “Analysis” (on the top left of the window, cf. Figure 2).

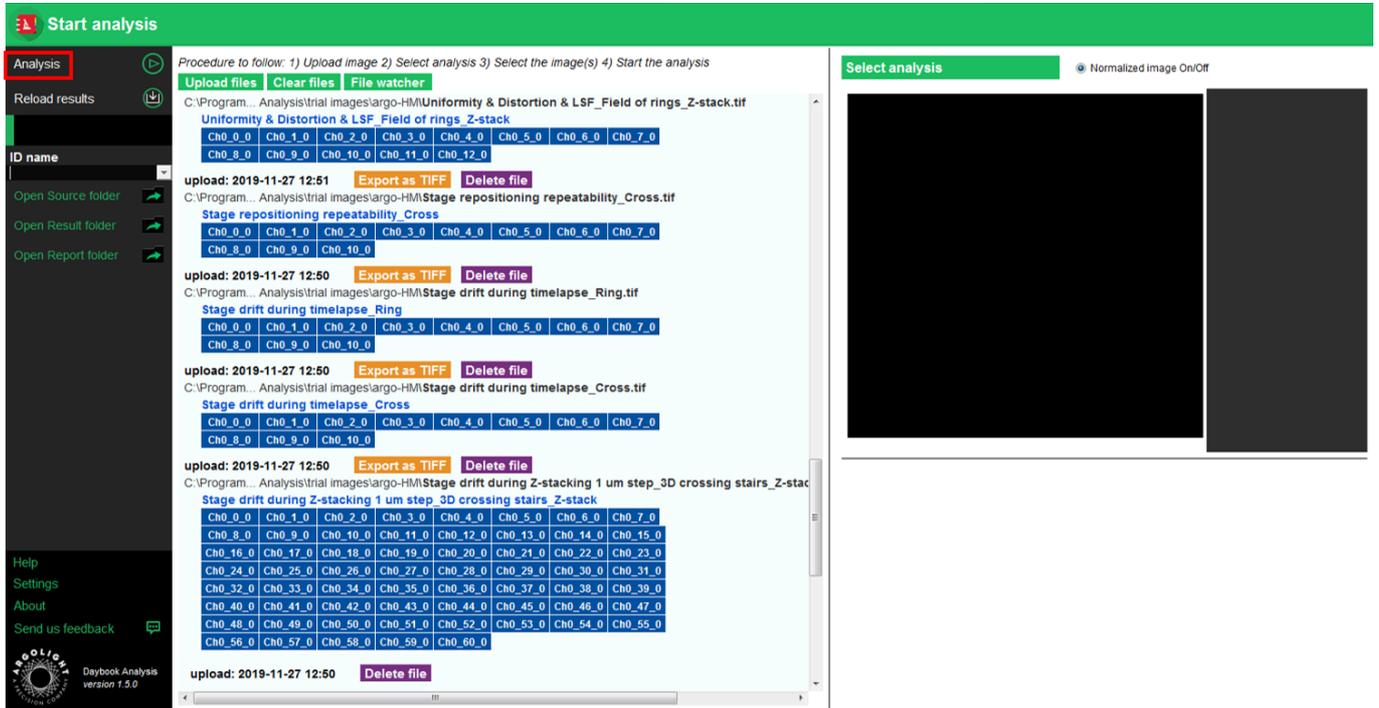


Figure 2: Analysis session window.

Image examples acquired following the acquisition recommendations described in the documentation of each analysis can be downloaded from the Daybook Launcher interface, as shown in Figure 3. We encourage you to process these images to have an idea of the image quality required to perform the analysis, and to start being familiar with the use of the software.

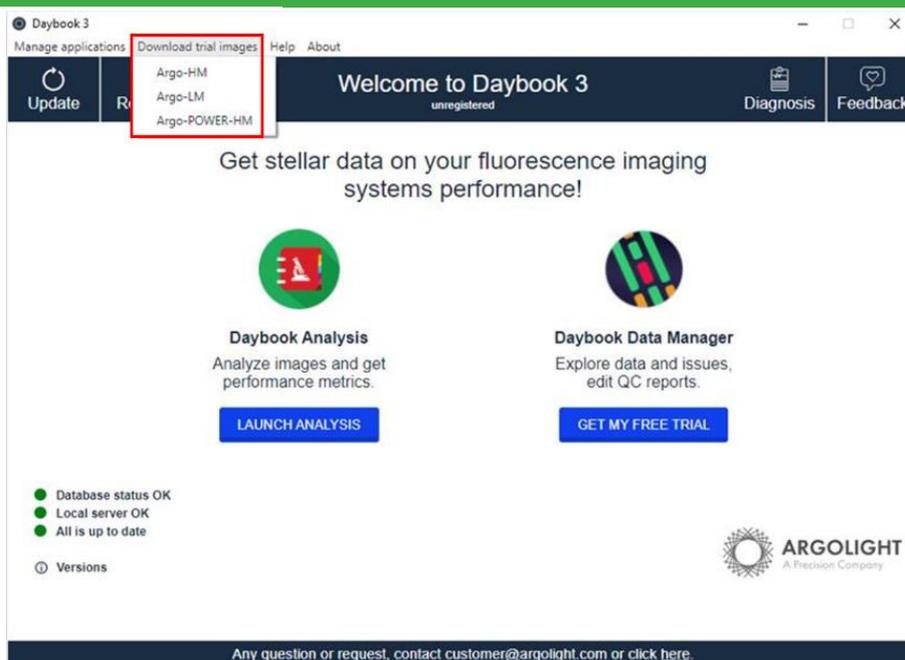


Figure 3: Daybook Launcher interface, from which it is possible to download trial images.

1. UPLOAD IMAGES MANUALLY

The “Upload file” button allows you to upload images, proprietary files or spectra text files (cf. Figure 4). Images can be Z-, T-, and multi-channels stacks.

You can upload several files in one run.

Note: When dealing with Yokogawa CV7000 and CV8000 HCS/HTS imaging systems, select the MES file to load all the images at once.

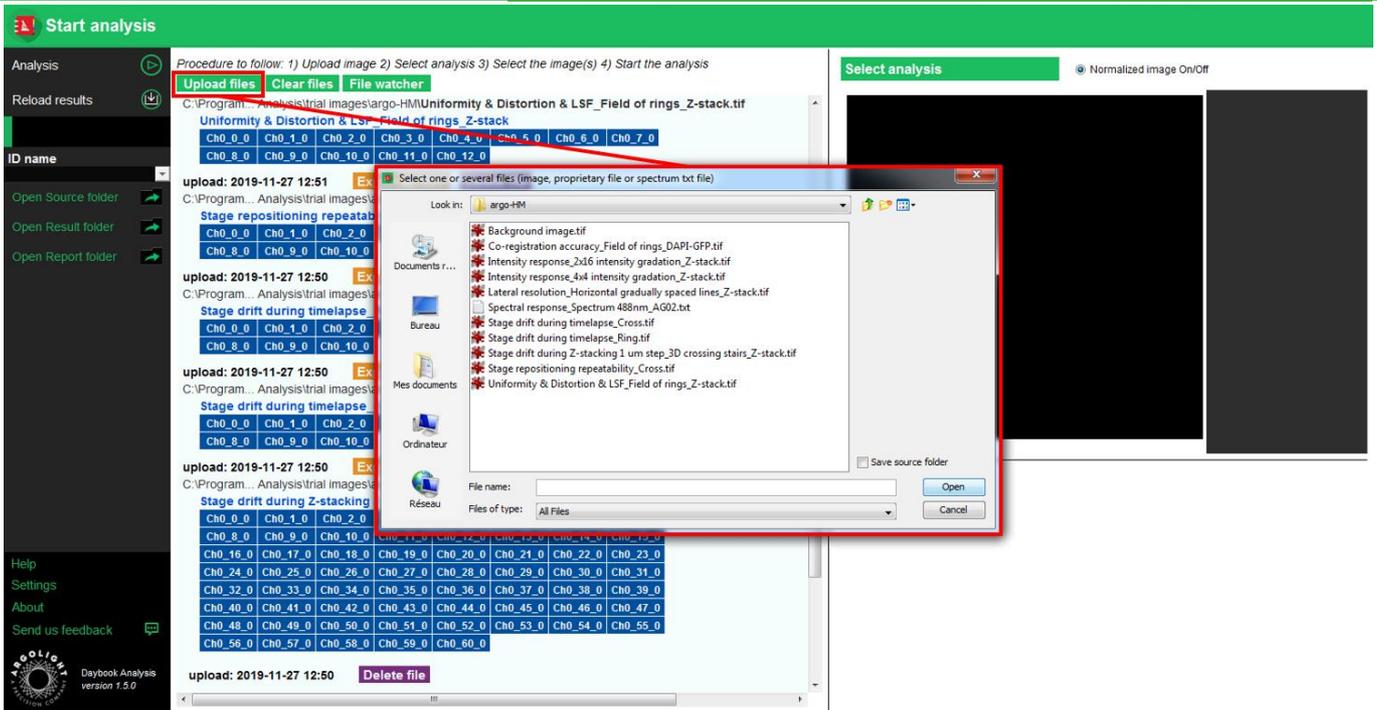


Figure 4: Manual upload of files.

Click on “Open”. The upload will start.

To save the source folder location, tick the “Save source folder” box (cf. Figure 5). You can also modify the default source folder in the “Settings panel”.

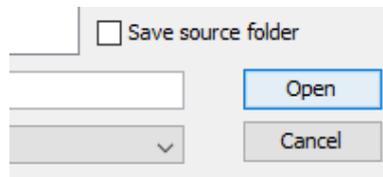


Figure 5: Save source folder.

2. UPLOAD IMAGES AUTOMATICALLY

The “File watcher” button allows you to automatically upload files that are added to a specific watched directory (cf. Figure 6). The watched directory is the source folder, defined in the “Advanced settings” of the “Setting panel”.

This feature can be useful to upload in Daybook Analysis images acquired from a microscope as soon as they are saved in a directory.

When the automatic upload is enabled, the button turns blue and the text becomes “File watcher ON”.

When the automatic upload is disabled, the button turns green and the text becomes “File watcher OFF”.



Note that if the name of an image file within the watched directory is modified, then the image file will be considered as a new file and automatically uploaded in Daybook Analysis.

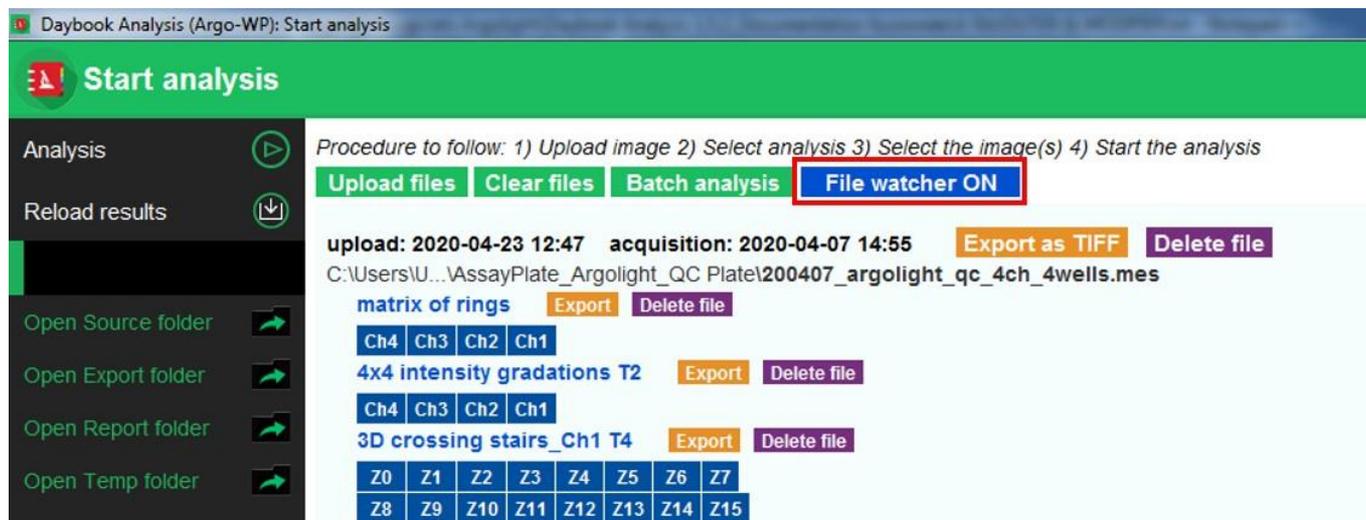


Figure 6: Automatic upload of files.

In order to automatize even more the quality control process in the future, it is recommended to save the captured images in a file which name contains the name of the imaged pattern.

Example: "2020_01_21_Argo-HM_Field of rings_40x_DAPI-GFP-TexasRed_Z-Stack".

Note: After some time, if no activity is detected in the watched folder, the “File watcher” is switched off. If this happens, click twice on the “File watcher” button to turn it on again.

3. CLEAR & SAVE IMAGES

- “Clear files”:

The “Clear files” button can be used to clear all the files in the analysis session.

- “Export as TIFF”:

The “Export as tiff” button can be used to convert a proprietary image (such as CZI, LIF, etc.) into a TIFF format, more easily usable. Note that this action may modify the detector bit depth.

- “Delete file”:

The “Delete file” button can be used to delete a single file in the analysis session.



V. RELOAD RESULTS

It is possible to reload and display again the results (maps, graphs, and tables) of a previous analysis saved into a CSV file, where they are stored with their relative path.

If a results file is missing (for example, a map has been deleted from the result folder), the loading might fail or be incomplete.

The reloading of the results works differently depending on whether Daybook Data Manager is disabled or enabled.

1. RELOAD RESULTS WHEN DAYBOOK DATA MANAGER IS DISABLED

a) Identify your results to a machine, lab, user, etc.

On the left-hand side menu, under profile name, type a name then 'enter' to create the profile (cf. Figure 7). To delete a profile, right click on the profile name (cf. Figure 8).

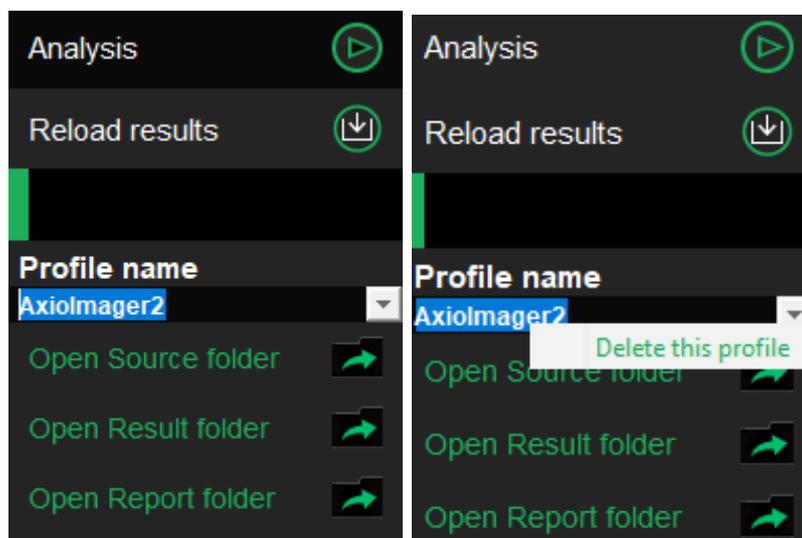


Figure 7: Creating a profile.

Figure 8: Deleting a profile.

This name will be noted in the saved results and added to the metadata in the saved results files (CSV) and to the result file name (cf. Figure 9).

You will thus be able to retrace your results to a specific identification name (user, lab, room, microscope, etc.).

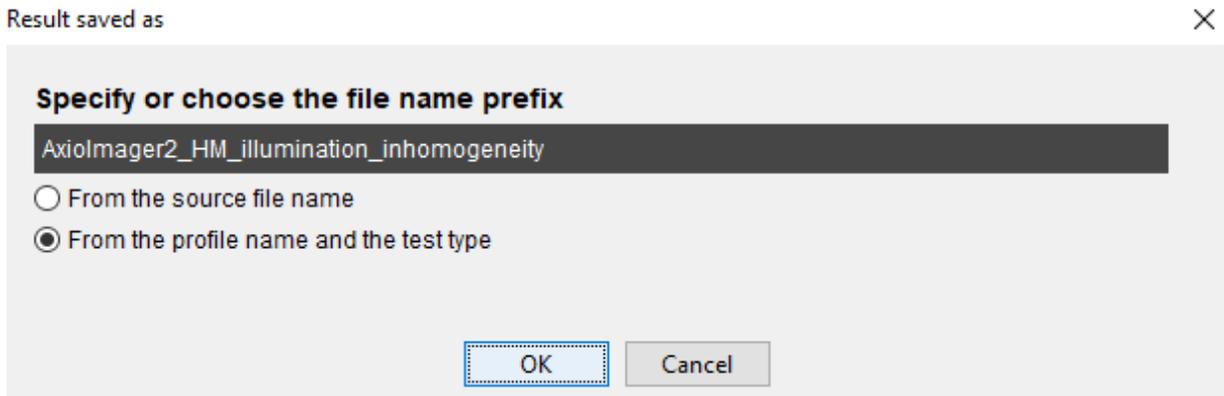


Figure 9: Choosing a name for the results file.

b) Reload Results

To reload results of a previous analysis, click on the “Reload results” button on the left-hand side and select a CSV file (cf. Figure 10).

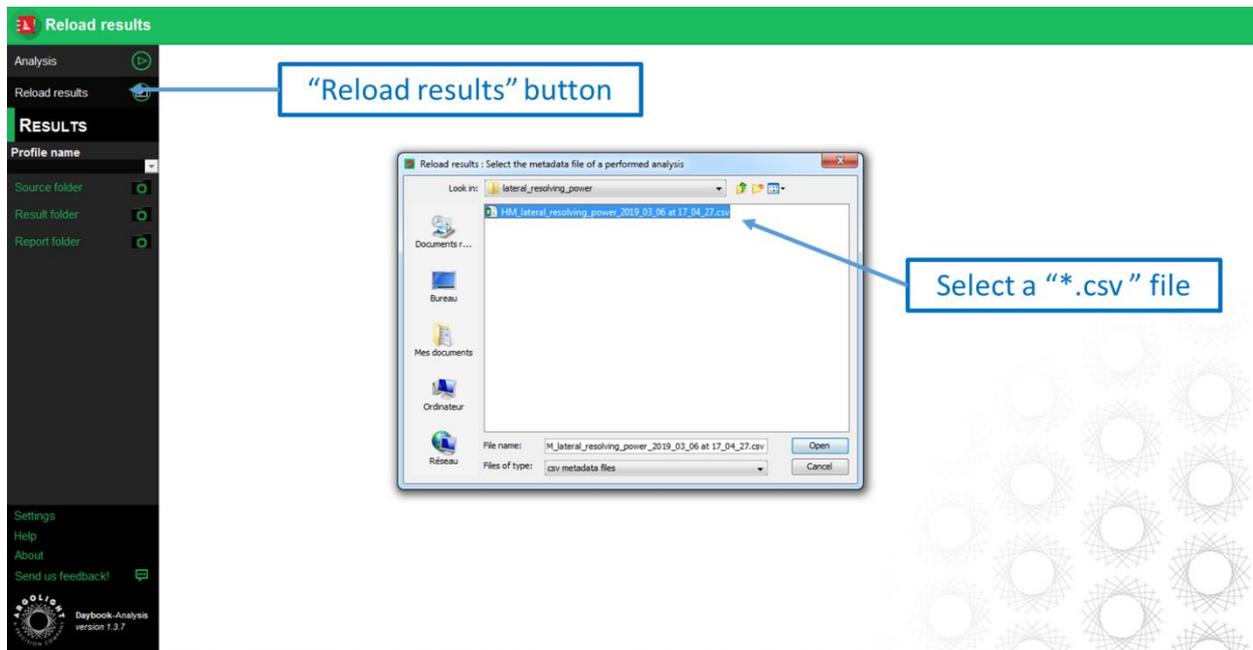


Figure 10: Reloading results when the database is disabled.

2. RELOAD RESULTS WHEN DAYBOOK DATA MANAGER IS ENABLED

At least one system, one acquisition profile and one channel must be created in Daybook Data Manager.

To reload a result, first choose a system and a profile. The results can be filtered by analysis type: click on “Filter results type” (cf. Figure 11).

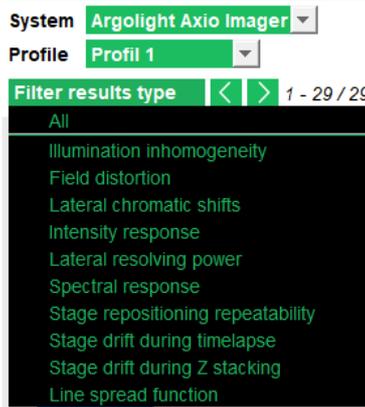


Figure 11: Filtering results.

Then, select one of the result images of the analysis and click on the “Reload the result” button on the middle right (cf. Figure 12). The results are organized from the most recent one to the least recent one, on several pages if there are too many analyses to display. The panel on the right displays the raw and results images, the associated metadata and the metrics generated.

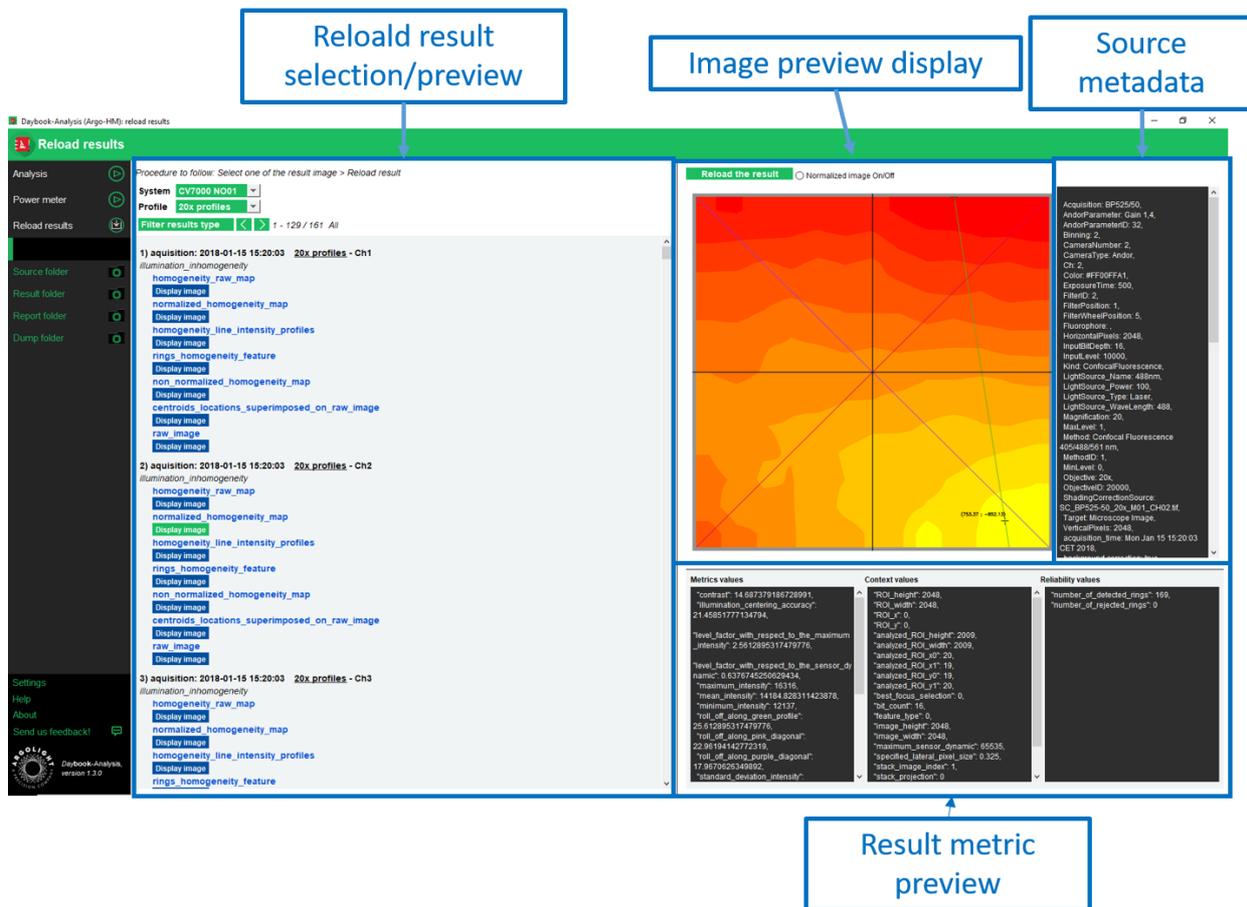


Figure 12: Reloading results when the database is enabled.

3. I HAVE ACQUIRED RESULTS WHEN THE DATABASE WAS DISABLED. CAN I LOAD THEM INTO MY DATABASE?



You cannot reload results that have been obtained from Daybook Analysis when Daybook Data Manager was not activated.

To display these results, you will have to run the analysis once again from the concerned raw images and then save the results into Data Manager for each image.



VI. PATTERN AND ANALYSIS CORRESPONDENCE

The two tables below present the correspondence between the patterns and the available tests in Daybook Analysis.

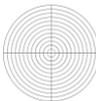
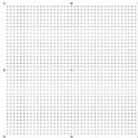
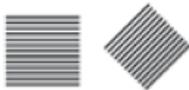
PATTERN IDENTIFICATION	PATTERN NAME	PATTERN DRAWING	ASSOCIATED ANALYSIS IN DAYBOOK
Pattern A	Target		Spectral response
Pattern B	Field of rings		Field uniformity Field distortion Lateral co-registration accuracy Line spread function Ring spread function
Pattern C	4×4 intensity gradation		Intensity response
Pattern D	2×16 intensity gradation		Intensity response
Pattern E	Gradually spaced lines		Lateral resolution
Pattern F	Matrix of crosses		<i>Not yet available within Daybook Analysis</i>
Pattern G	Sphere		Accuracy of 3D reconstruction

Table 1: Pattern and analysis correspondence (first part).



PATTERN IDENTIFICATION	PATTERN NAME	PATTERN DRAWING	ASSOCIATED ANALYSIS IN DAYBOOK
Pattern H	Repositioning crosses		Line spread function Stage drift during timelapse Stage repositioning repeatability Spectral response
Pattern I	3D crossing stairs		Stage drift during Z-stacking
Pattern J	Word ARGOLIGHT		Spectral response
Pattern K	3D matrix of rings		<i>Not yet available within Daybook Analysis</i>
Pattern L	Field of rings on a background		<i>Not yet available within Daybook Analysis</i>
Pattern M	Geometrical figures		<i>Not yet available within Daybook Analysis</i>
Pattern N	Grid		<i>Not yet available within Daybook Analysis</i>

Table 2: Pattern and analysis correspondence (second part).

VII. IMAGE ACQUISITION RECOMMENDATIONS FOR EACH PATTERN

The table below presents the image acquisition recommendations for each pattern so that the captured images are correctly and completely analyzed in Daybook Analysis.

PATTERN NAME	Z-STACK	MULTI-CHANNEL	TILES (OR SCENES)	T-STACK
Field of rings	Recommended but not mandatory	Mandatory only for the “lateral co-registration accuracy” analysis; recommended otherwise	No	No
4x4 Intensity gradation	Recommended but not mandatory	Recommended but not mandatory	No	No
2x16 intensity gradation	Recommended but not mandatory	Recommended but not mandatory	No	No
Gradually spaced lines	Recommended but not mandatory	Recommended but not mandatory	No	No
Repositioning crosses	No	No	Yes (if no T-stack)	Yes (if no tiles nor scenes)
3D crossing stairs	Yes	No	No	No
Sphere	Yes	Not mandatory	No	No

Table 3: Image acquisition recommendations for each pattern.



**Encountered an issue or a question when using Daybook Analysis?
Please send a screenshot and your issue description at:
customer@argolight.com**