Table of contents

ARGOLIGHT
A Precision Company

I. INTRODUCTION

The "Monitoring" window of Daybook Data Manager gives access to:
- o The display of your analysis results along a timeline.
- o The tracking of specific performance metrics and alerts based on pre-defined tolerance thresholds.
- o The centralization of the quality control data and events about a system.

II.   TIMELINE MANAGEMENT

In the "Monitoring" window, the timeline displays the evolution of specific metrics over time (*cf.* Figure 1).

Figure 1: Quality control timeline.

1. DISPLAY ANALYSIS RESULTS ON THE TIMELINE

1- How to add a result to the timeline?

All data displayed on the timeline come from the analyses previously performed in Daybook Analysis.

A set of one or several analyses on a specific date (year-month-day @ hours:minutes:seconds) is called a ***"quality point"***.

When a valid Daybook Data Manager license has been registered, the results (from Daybook Analysis results pages) can be transferred into Daybook Data Manager using the "Save in Data Manager" button (*cf.* Figure 2).
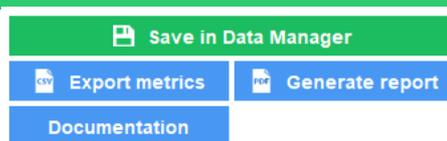
Figure 2: Transfer of results from Daybook Analysis to Daybook Data Manager.

Daybook Analysis will require to select the system, acquisition profile and corresponding channel. By default, the results will be saved at the acquisition date of the image if available in the metadata. If the acquisition date is not available in the metadata of the image, it is possible to save the results at the present date (date of the analysis) or at a custom date (*cf.* Figure 3). The chosen date is the one that will be displayed within the timeline of Daybook Data Manager.
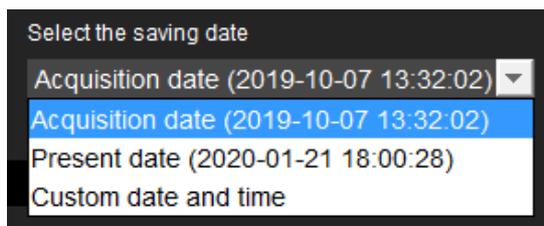

Figure 3: Choose the saving date that will be displayed in Daybook Data Manager.

Many channels can be created within Daybook Data Manager. Each channel has its own timeline.

Notes:
- A channel is a set of image acquisition settings (excitation and emission wavelengths, illumination power, detector exposure time and/or gain, etc.) that are used to acquire the patterns images of Argolight hardware products.
- You can save two subsequent results in Daybook Data Manager that are separated by a **minimum time interval of one second**.

2- How to add several results in one go to the timeline?

Multiple quality points can be added at one time when using the "batch analysis" feature in Daybook Analysis. The "batch analysis" is performed in Daybook Analysis and the results are displayed in Daybook Data Manager.

If the acquisition date is available within the metadata of the analyzed images, then the batch analysis saves the results with the date at which the images were acquired, called the "acquisition date" in the algorithm metadata.
If the acquisition date is not available within the metadata, then the batch analysis saves the results at the current date, called the "analysis date" in the algorithm metadata.

We advise to read the batch analysis documentation (found in Daybook Analysis) to learn more.

3- Frequently asked questions

- **The result is not displayed in the timeline**

If the result does not appear in the timeline after clicking on "Save in Data Manager", we recommend that you refresh the data using the "Refresh data" button in the "Monitoring" window of Daybook Data Manager, at the top right-hand corner.
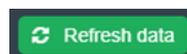
If the result is still not displayed:
We recommend you verify that the metrics corresponding to the result (see "Metrics in the timeline" below) are among the metrics displayed.

- **Metrics in the timeline**

Each analysis has a list of associated metrics.
The timeline can display up to 10 metrics per analysis at the same time.
To see how to add more metrics on the timeline display, please refer to chapter 3 "Track metrics and set quality thresholds".

4- How to remove a result from the timeline?

Results can be removed from the timeline. On the "Monitoring" window, click on the "Manage analyses" button. You will access the list of all your systems, acquisition profiles, channels and associated analyses.

Analyses can be deleted one by one or as a complete quality point grouping several analyses.

2. ADD COMMENTS

Comments can be useful for keeping trace of a specific event: writing a warning, adding a note, recording a visit of the maintenance technician, etc.

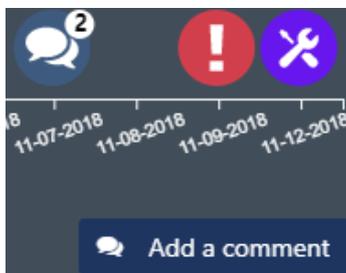**Note:** Comments will not be exported into the PDF reports.

Figure 4: Comments on the timeline.

On the "Monitoring" window, click on the "Add a comment" button (*cf.* Figure 4).
A window will appear in which you can select the date, the concerned item (system, acquisition profile or channel), the type of comment (maintenance, note, warning, other) and the author (optional).
This will display the comment at the bottom of the timeline.

When several comments are attributed to the same date, a bubble will show the number of comments (*cf.* Figure 4). By clicking on the bubble, you will display all the comments linked to this date.

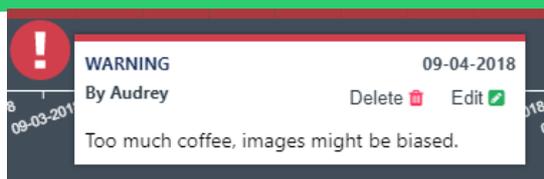To edit or delete a comment, click on its bubble (*cf.* Figure 5).

Figure 5: Edit or delete a comment.

3. CONFIGURE THE TIMELINE

The timeline gives a visual indication on the status of your metrics, using a range of red-orange-green colors. The color changes depending on values the user has previsouly set as tolerance thresholds for each metric.

To display the configuration panel of the timeline, click on the switch in the upper right corner of the timeline (*cf.* Figure 6).

In this panel, you can add or delete an alert, set your tolerance threshold(s) for each performance metric, import or export a configuration file, etc.

Thresholds template for typical microscopy acquisition modes (wide-field, confocal laser scanning, etc.) are proposed to help the user configuring the timeline. They are issued from our experience, gathered from the litterature and/or recommended by experts.

Figure 6: Configuration panel of the timeline.

If you are familiar with the usual metrics values for your system, we recommend you to modify the tolerance thresholds accordingly and save them as your own metrics template.

If you do not know the typical metrics values for your system, we recommend you start monitoring them, to better understand how your system usually behaves, and then set the torelance thresholds accordingly.

We recommend monitoring the primary metrics of each analysis, shown in Table 1.

ANALYSIS NAME	PRIMARY METRICS WE RECOMMEND TO MONITOR
Power meter	Power average Power stability
Field uniformity	Centering accuracy Roll-off of the pink diagonal profile Roll-off of the purple diagonal profile Coefficient of variation Field uniformity
Field distortion	Geometrical distortion rate Maximum distortion rate along X Maximum distortion rate along Y Maximum of the vector magnitudes
Lateral co-registration accuracy	Pearson correlation coefficient Maximum of the vector magnitudes
Line spread function	FWHM of the left curve in the horizontal and vertical profiles FWHM of the right curve in the horizontal and vertical profiles SNR in the horizontal and vertical profiles
Ring spread function	FWHM of the left curve in the horizontal and vertical profiles FWHM of the right curve in the horizontal and vertical profiles SNR in the horizontal and vertical profiles
Lateral resolution	Lateral resolution at zero contrast SNR
Optical sectioning strength	Optical sectioning strength at 50 % normalized contrast
Stage repositioning repeatability Stage drift during timelapse Stage drift during Z-stacking	Maximum of the drifts along X wrt reference position Maximum of the drifts along Y wrt reference position Maximum of the drift magnitudes wrt reference position
Accuracy of 3D reconstruction	Difference between the measured and expected ratios
Intensity response 4×4 and 2×16	Pattern dynamic range Intensity maximum Intensity minimum Pearson correlation coefficient of the actual intensity response
Spectral response	Partial correlation coefficient Roll-off
Point spread function	FWHM of the fitting function along X, Y and Z SNR along X, Y and Z

Table 1: Suggested metrics to monitor for each analysis.

ARGOLIGHT
A Precision Company

III.   DATA MANAGEMENT

1.   RESULTS PANEL

The "results panel" is displayed automatically and cannot be deleted. It displays the same results (images, heat maps, graphs and tables) as in Daybook Analysis. These results are organized spatially in the same way as on the results page of Daybook Analysis. The adding value of this panel is that the display of the results can be switched by date, via the purple buttons at the top right (*cf.* Figure 7).
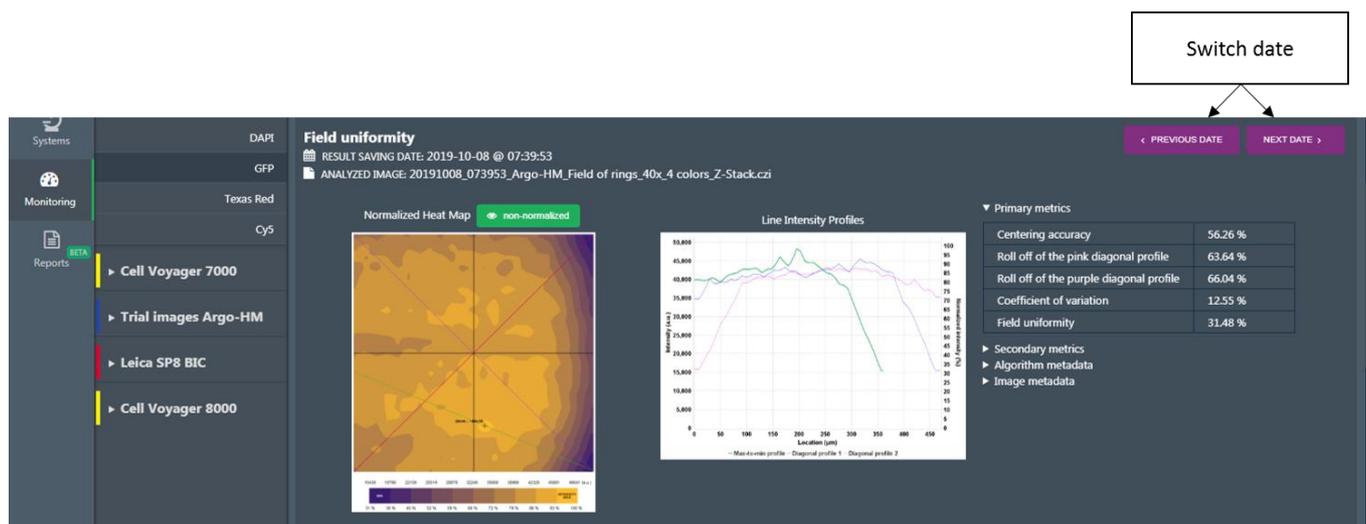

Figure 7: Results panel.

2.   CARDS

1-   General

The results gathered from Daybook Analysis can be displayed below the timeline as "cards".

There are three types of cards:
- o   The ***"line chart"*** card, which displays the evolution of a specific metric over time.
- o   The ***"table"*** card, which displays a table of the relevant parameters of an analysis.
- o   The ***"image"*** card, which displays an image generated by an analysis.

There is no limit to the number of cards that can be displayed.

On the "Monitoring" window, click on the "Add new card" button, just above the timeline. You will access the types of cards and the metrics associated with the analysis currently displayed in the timeline (*cf.* Figure 8). The new card will then be added below the quality control timeline.
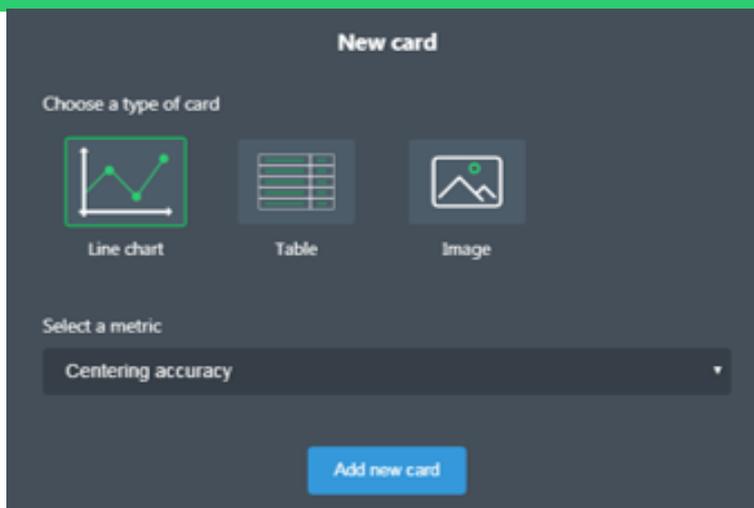
Figure 8: Add a new card.

Right-click on a card to save its content either as a PNG or JPEG file (for line charts and images), or as a TXT or CSV file (for line charts and tables).

To remove a card, click on the bin icon, at the top right of the card. Removing a card will not affect the data in the database. You will be able to re-create the card later-on if needed.

2- "Line chart" card

An example of a "line chart" card is shown below (*cf.* Figure 9). It displays the evolution of results of a single monitored metric (here the "Centering accuracy" of the "Field uniformity" analysis) versus time.
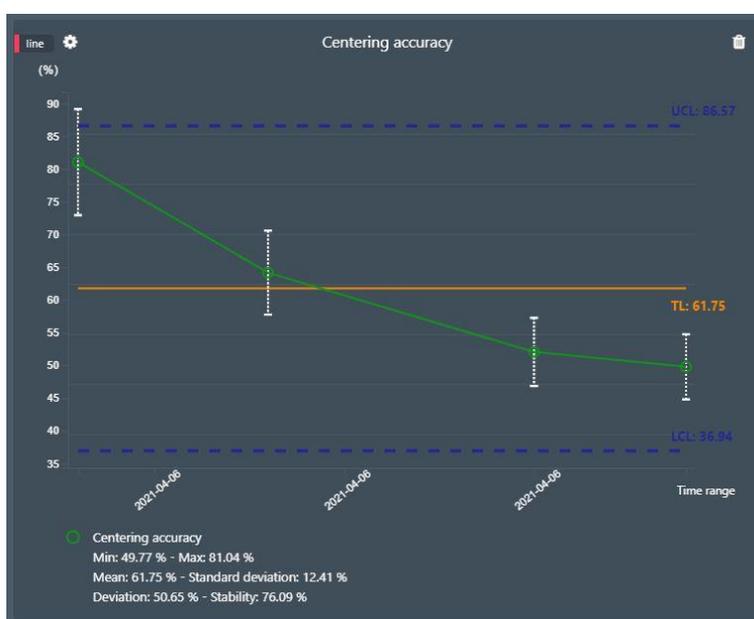

Figure 9: Example of a "line chart" card, including all the available options: error bars, trend line, upper control limit (UCL), lower control limit (LCL), and statistics (min, max, mean, standard deviation, deviation and stability).

To define the settings of the "line chart", click on the cog, at the top left of the card. In the opened panel, you will be able to add into the displayed data: error bars, a trend line, upper and lower control limits, as well as statistics (*cf.* Figure 10).
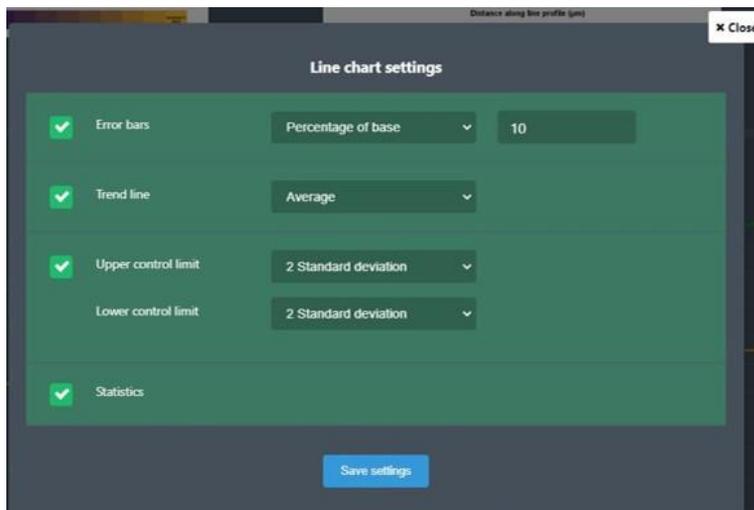

Figure 10: Settings window for the "line chart" card.

The statistics are calculated as follows:
- The minimum is the minimum value V_{min}.
- The maximum is the maximum value V_{max}.
- The average for *n* values V_i:

$$Average = \frac{1}{n}\sum_{i=1}^{n} V_i$$

- The standard deviation for *n* values V_i:

$$SD = \sqrt{\frac{1}{n}\left(\sum_{i=1}^{n} V_i^2\right) - Average^2}$$

- The deviation (in %):

$$Deviation = 100 \times \frac{V_{max} - V_{min}}{Average}$$

- The stability (in %):

$$Stability = 100 \times \left(1 - \frac{V_{max} - V_{min}}{V_{max} + V_{min}}\right)$$

**Encountered an issue or a question when using Daybook Data Manager?
Please use the feedback button in the software
Or send a screenshot and your problem description to:
customer@argolight.com**