

# CytoSMART<sup>®</sup> Omni



## Instruction manual

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## Safety information

To avoid damage or malfunction of the CytoSMART® Omni:

- Be sure to set this device on a firm, stable and horizontal surface. The device may break or cause injury if it falls.
- Shut down the device immediately if it produces smoke, a strange odor or unusual noise. Continued use may lead to fire. Unplug the power cable and USB cable immediately.
- Do not connect cables in ways other than those mentioned in this manual, as this may cause damage and lead to fire.
- If water or other liquid enters the device, discontinue use immediately. Continued use may lead to fire. Unplug the power cable and USB cable immediately.
- Do not attempt to repair or remove the outer case of the device. If you open this instrument, you put yourself at risk of bodily harm due to electrical shock in addition to damaging the device.
- Never attempt to repair, disassemble or modify this device yourself, tampering with this product may result in injury or fire.
- Do not drop the device or allow objects to fall onto it.
- Do not allow the device to be submerged in liquid.
- Do not place heavy objects on top of this device and never stand or lean on this device. Failure to follow this may cause the equipment fall or collapse, which results in possible breakage and/or injury.
- Do not autoclave the device.
- Do not perform the sterilization cycle of an incubator with the device inside.

## 1. Introduction

Thank you for purchasing the CytoSMART® Omni. The CytoSMART® Omni is an in-incubator automated live-cell imager that uses state of the art optics and image analysis software. Its innovative design allows you to acquire a brightfield scan of any cell culture vessel within minutes and provides almost instant cloud-based image analysis of your cell culture.

### How easy the CytoSMART® Omni works

The CytoSMART® Omni can be installed within several minutes and requires minimal training.

Hardware and software work together like a charm. The system consists of the CytoSMART® Omni, an automated live-cell imager, which operates inside a CO<sub>2</sub>-incubator. The device is linked to a Windows laptop that is delivered together with the CytoSMART® Omni. Via the laptop, you can customize your imaging settings and get started. The images are then transferred to the CytoSMART™ Cloud via an internet connection. You can access the CytoSMART® Cloud via any web browser on any device with an internet connection. In the cloud, it is possible to view both the unprocessed and analyzed data and download the images, videos and Excel-files regarding the cell culture. All your data is right there when you need it.

### Ideal circumstances for cell cultures

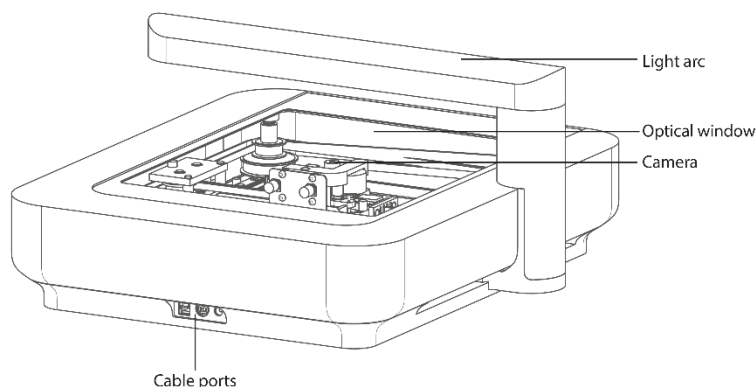
With the CytoSMART® Omni, cells can remain in their ideal culture conditions inside the incubator by monitoring them online. There is no need to disturb the best environment of your experiment.

The CytoSMART® Omni is ideal for performing viability experiments or migration assays in multi-well plates. The system can also be used for cell culture quality control or experiments in microfluidic devices.

### System overview

The hardware of the CytoSMART® Omni consists of:

1. Light arc – Contains the light source (LED) for imaging.
2. Cable ports – For connecting the device to power and to the laptop via USB.
3. Optical window – Can hold most transparent culture vessels.
4. Camera – Camera that takes the images.





## 2. Getting started

The content of the CytoSMART® Omni package contains:

1. CytoSMART® Omni
2. USB cable
3. Power adapter
4. CytoSMART® Omni Instruction manual
5. CytoSMART® Omni quick starter guide
6. License key

Remember, if you ever have any questions regarding your purchase, please visit <https://www.cytosmart.com/support> or contact our support staff via [support@cytosmart.com](mailto:support@cytosmart.com) or the live chat function in the software or in the cloud. We are happy to help you out.

### 3. Setting up the CytoSMART® Omni

It is really easy to set up the CytoSMART® Omni. All you need are these items:

- An incubator
- The CytoSMART® Omni
- USB-cable
- Power-adapter for the Omni
- Omni adapter plate
- License key (delivered with the Omni)
- A Windows tablet, laptop or PC with internet access (preferably via a LAN-cable) and a USB 3.0 port. The Windows device needs to be on AC power to make sure the device does not power off during the experiment.

Be sure to remove any wrapping before placing the CytoSMART® Omni inside the incubator. Also clean the device with a lint-free wipe and 70% ethanol or isopropanol.

**Important:** Do not use acetone to clean the device and do not autoclave the device.

#### Setup Procedure

**Important:** Place the CytoSMART® Omni in the incubator at least 1 hour before the start of your experiment to make sure the device has equilibrated to incubator temperature.

1. Turn on the tablet, laptop or PC. Make sure the laptop or tablet is connected to the power plug.
2. Check if the incubator has a cable port in the back.
  - a. If so, guide the USB cable and the power cable through it.
  - b. If no port is present, place the cables between the door and frame of the incubator.
3. After the cables are properly guided, place the CytoSMART® Omni inside the incubator and plug in the cables (fig. 1).
4. Plug the other end of the power cable in a power socket.
5. Plug the other end of the USB cable in a USB-3.0 port of the PC or tablet. You can recognize a USB-3.0 port by the superspeed logo (and a blue bar; fig. 2).
  - a. After plugging in the USB cable, the device will home to its start position.



*fig. 1. USB port (left) and power port (right) of the CytoSMART® Omni.*

**Important:** make sure to first plug in the power cable before plugging in the USB cable.

6. Clean the Omni adapter plate with a damp lint-free wipe with 70% ethanol or isopropanol (IPA).
7. Place the adapter plate on the CytoSMART® Omni in such a way that the curved edges of the adapter plate align with the curved edges of the glass plate (fig. 3A).



*fig. 2. Examples of a USB-3.0 port.*

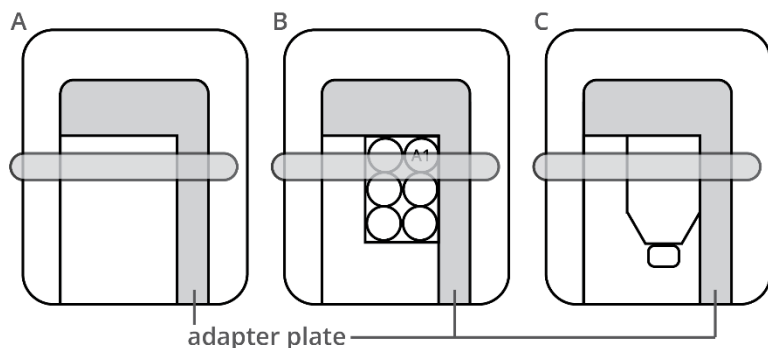


fig. 3. Top view images of A) Correct placement of the Omni adapter plate on the CytoSMART® Omni, B) Correct placement of a well plate, and C) correct placement of a T-flask.

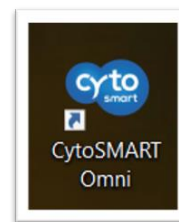


fig. 4. CytoSMART® Omni app icon.

## Registration of the Device

Before you can use the CytoSMART® Omni, you must register it. This only needs to be done the first time you use the CytoSMART® Omni.

1. Start the preinstalled CytoSMART® Omni app by double clicking on the icon on the desktop (fig. 4).
2. In case you are asked if you want to allow this app to make changes to your device, answer with “Yes”.
3. Once the app has started you will be asked to log in using you email and password (fig. 5). In case you do not have an account yet, press “Register” to create a new account. You will be led to the registration form (fig. 6). Please fill in all the details and click “Sign up”.

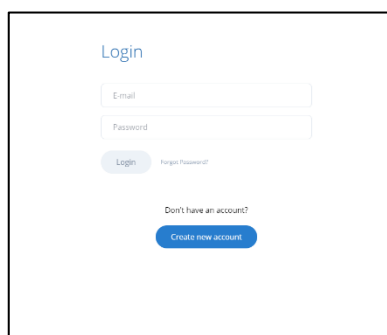
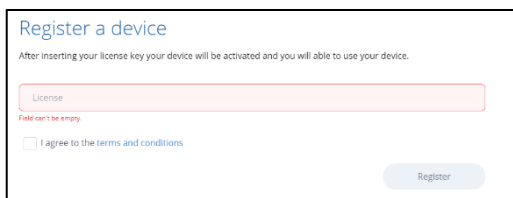


fig. 5. Log in screen of the CytoSMART® Omni app. Sign in with your email and password or create a new account.

fig. 6. Sign up registration form.

The next step is to register the device. The license key for this device is provided on a card that is delivered together with the device. Enter the license key that is provided in the field “License” on the card and click “Register” (fig. 7).

A screenshot of a web form titled "Register a device". Below the title is a sub-header: "After inserting your license key your device will be activated and you will be able to use your device." There is a text input field labeled "License" with a red border and a red error message below it that says "Field can't be empty". Below the input field is a checkbox labeled "I agree to the terms and conditions". At the bottom right of the form is a blue "Register" button.

*fig. 7. Register your device by entering the license key.*

**Congratulations, you have now successfully registered and activated your CytoSMART® Omni!**



## 4. Performing an experiment

Before you can start an experiment, you need to place your culture vessel on the CytoSMART® Omni. In case you are using a well plate, place it with well A1 in the corner of the adapter plate (fig. 3B). Subsequently you can select the well plate size in the CytoSMART® Omni app by clicking “Select Your WellPlate” (fig. 8).

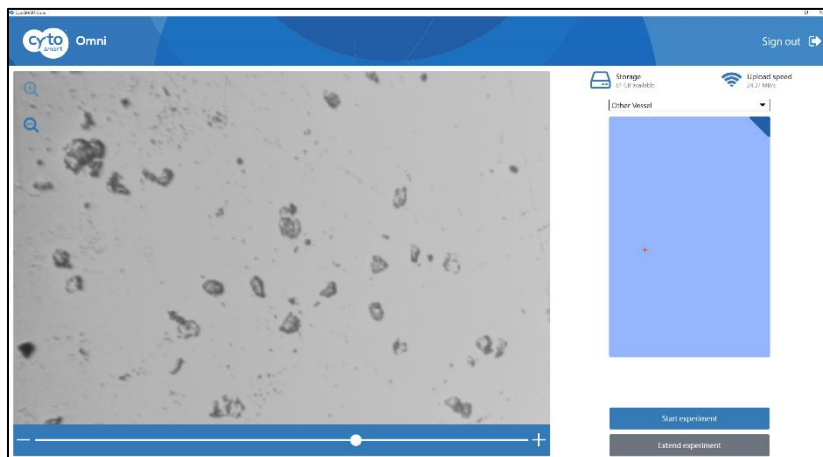


fig. 8. Experiment page. Select the well plate size by clicking “Select your WellPlate”.

Choose the correct well plate from the dropdown list that appears (fig. 9). In case you are using another cell culture vessel, select “Other Vessel”.



fig. 9. Select the correct cell culture vessel from the drop-down menu.

Once you have selected your well plate size, an image of the well plate appears on the right side of the screen (fig. 10A). In case you have selected “Other”, a light blue rectangle will appear (fig. 10B). Click on a certain spot on the blue well plate image/rectangle to move the camera to that position, a red cross will appear indicating the current position of the camera. Use the arrow keys for fine movements.

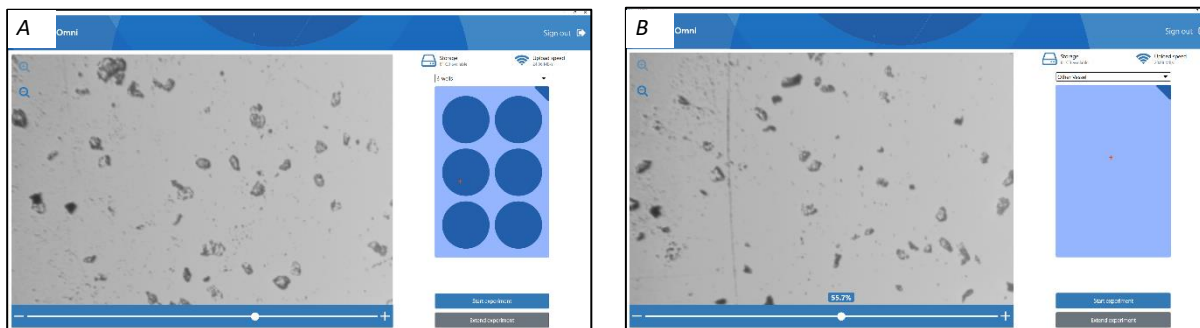


fig. 10. A) Use the image of the well plate on the right to navigate to one of the wells. B) Navigate through your cell culture vessel using the mouse or arrow keys. A red cross indicates the current position of the camera. Use the slider bar on the bottom left for focusing. Click and drag the arrows for coarse adjustment of the focus, click the plus- or minus for fine changes.

## Focusing on the Cells

1. Go to the middle of one of the wells, use the arrow keys for fine movement to go exactly to the middle of a well.
2. To focus, move the slider bar (bar on the bottom left; fig. 10) by dragging it with your mouse. Click the plus- or minus-sign for fine changes in focus. For proper analysis of your cells, you should see a contrast. You can choose the type of contrast that you prefer:
  - Set the focus such that the cells are dark with sharp edges (fig. 11A)
  - Set the focus such that the cells are white with a sharp dark edge (fig. 11B)
3. Once you have set the focus, move to the middle of a couple of other wells spread throughout the well plate to check whether the cells in the other wells are also in focus.
  - In case the cells in the other wells are not in focus, set the focus such that the cells in most wells are clearly visible (try to find an average focus level).

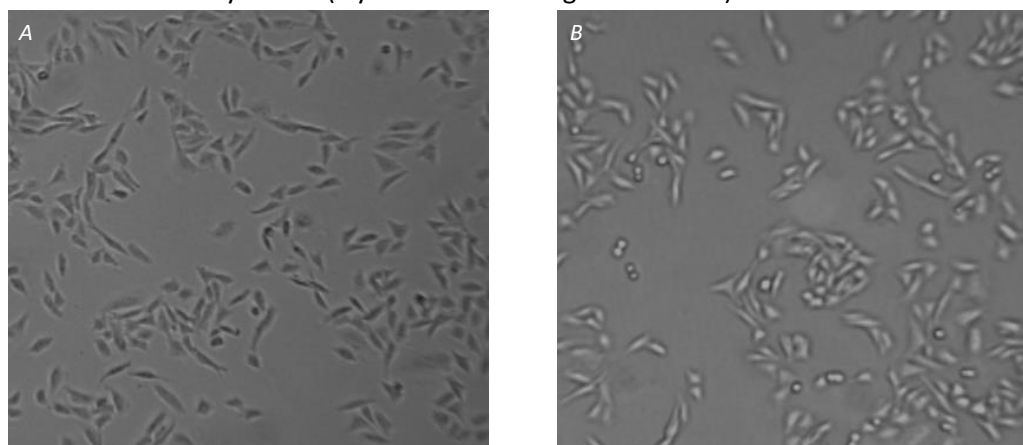


fig. 11. Examples of the correct focus. Left: cells are completely black with sharp edges. Right: cells are white with a clear black edge.

## Starting an experiment

When the focus is set, you are ready to start your experiment. To start the experiment, follow the protocol below:

1. Start the experiment by clicking on the blue “Start experiment” button (fig. 10). The first time you perform an experiment, you are immediately led to the *Create project* page to create a project (fig. 12). Your experiments are automatically stored within a project, which you can view later in the CytoSMART® Cloud. In the *Start a project* page, you can name the project and give it a description. The next step is to assign a colored icon to the project. This helps you to find your project easily, based on the color of the icon. Click the “Create my project” button to finish the setup.

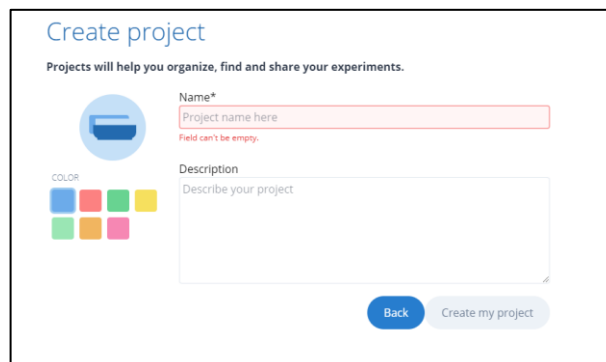


fig. 12. Create a new project by filling in the details.

2. Once you have created a project, you will be led to the *Settings* page. In case you already have a project, you will be led to the *Settings* page immediately after you click the blue “Start experiment button”.
3. Select a project from the drop-down list on the top left of the *Settings* page (fig. 13) or create a new project by selecting “Create a new project”.
4. Next, give the experiment a name.
5. Check whether the correct culture vessels is selected. In case you have selected the wrong type of culture vessel you can change this by going back to the *Experiment* page (fig. 13).
6. Subsequently select whether you want to perform time-lapse imaging or take a single scan. You can set the time interval of the time-lapse experiment using the drop-down menu (fig. 13).
7. Select the type of image analysis that needs to be applied to your images. You can choose between “Confluence detection”, “Colony detection” or “Scratch assay”.
8. In case you would like to be updated about the status of the experiment, tick the “Send me status updates by email on each scan”-checkbox. If you want to be notified when there is an internet connection issue, tick the “Alert me with SMS”-checkbox.

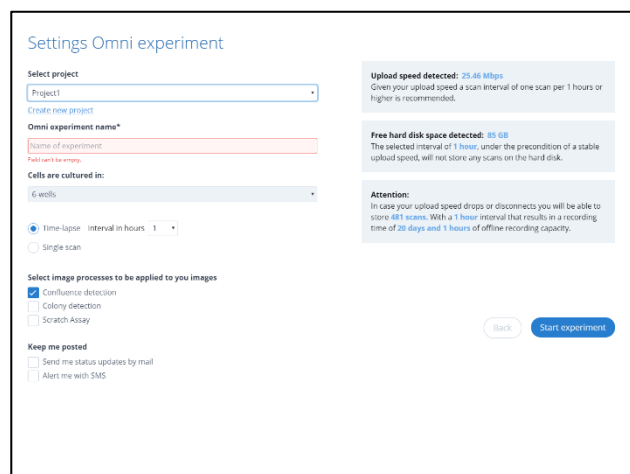


fig. 13. Set the experiment parameters in the “Settings Omni experiment” page.

- After entering the details, click the blue “Start experiment” button and the first scan of the experiment will start! A new window opens indicating a scan is in progress (fig. 14) and you will receive an email that the experiment has started with a link to the experiment page in the cloud. During the scan, you can not adjust any settings of the experiment.

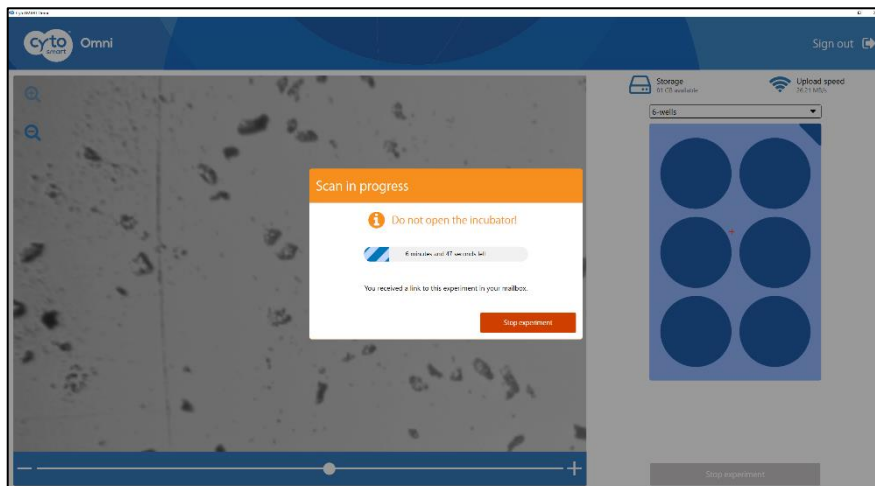


fig. 14. Scan in progress window.

## During the Experiment

After approximately one minute of inactivity, the app will go in sleep mode (fig. 15). Even though the app is in sleep mode, the CytoSMART® Omni will continue scanning your cells according to your settings.

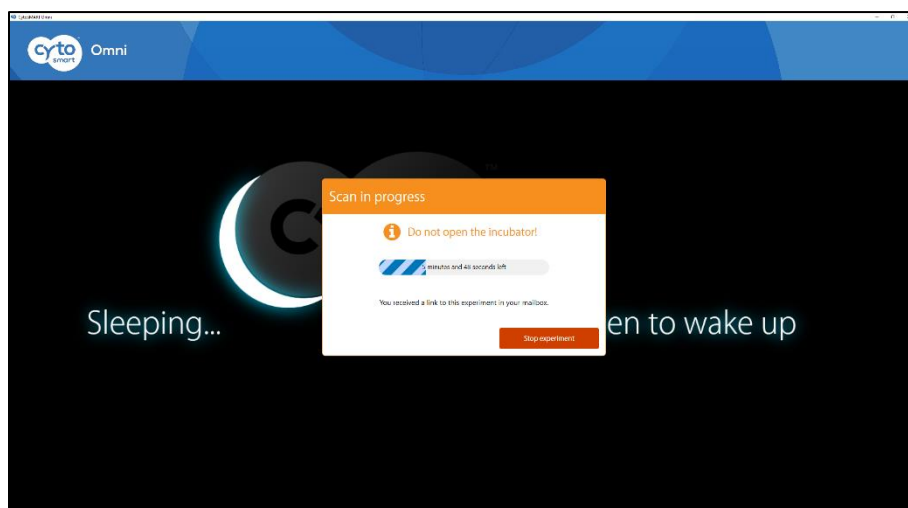


fig. 15. Sleep mode while a scan is being made.

Once the scan is finished, the *Scan in progress* window will disappear (fig. 16) and the camera and LED will turn off to protect your cells from light in-between scans.

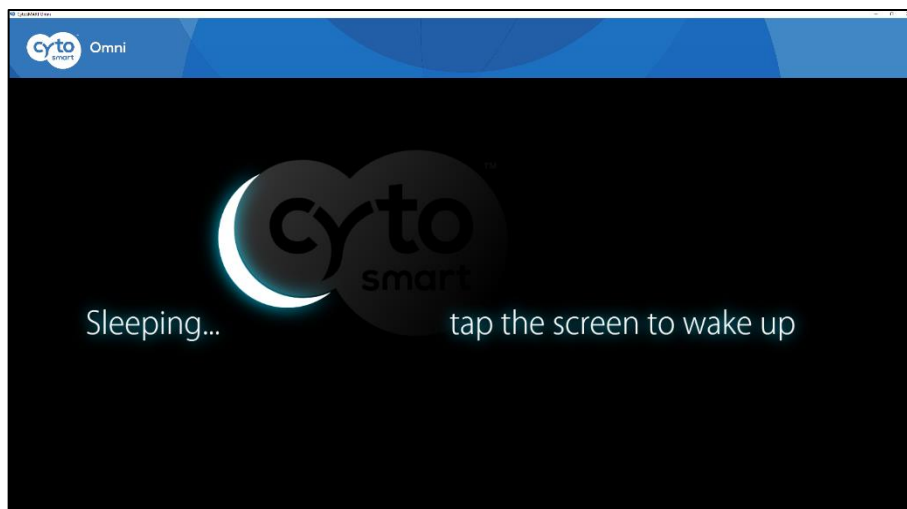


fig. 16. Sleep mode in-between scans.

In case you would like to check your cells or adjust the focus level between scans, tap or click on the screen (fig. 16) to go to the *Experiment page* (fig. 17). The camera and LED will turn on so you can navigate through your well plate and adjust the focus level if necessary. You cannot adjust the type of culture vessel that you have selected. A progress bar on the bottom right indicates the time until the next scan will start.

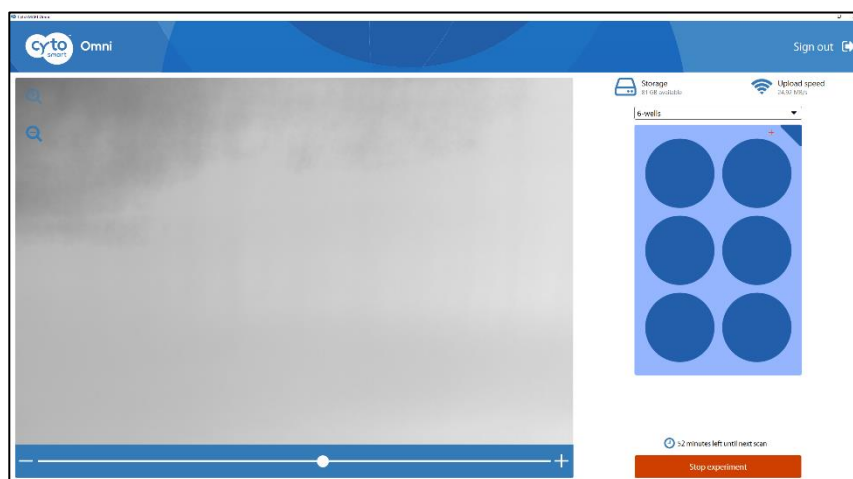


fig. 17. Experiment page between the scans of an experiment. If necessary, you can navigate through your well plate and/or adjust the focus level in-between scans.

## Ending an experiment

Stopping is as easy as starting. To end an experiment, select the red “Stop experiment” button in the *Scan in progress* window (fig. 14 and 15) or in the *Experiment page* (fig. 17). A new window will appear asking you if you really want to stop the experiment (fig. 18). Select “Stop experiment” to confirm. A confirmation email indicating that the experiment has ended will be sent.

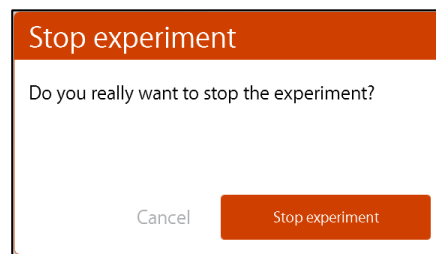


fig. 18. Stop experiment window. Select “Stop experiment” to confirm.

Once the experiment has stopped, you are led to the *Experiment page* (fig. 8) so you can start a new experiment or stop the Omni app.

## 5. Appending a scan to an experiment

In case you would like to combine several single scans into one experiment, you can add a scan to an existing experiment containing one or more single scans.

First, select the correct culture vessel and focus on your cells as explained above. Subsequently, click on the gray “Extend experiment” button (fig. 19)

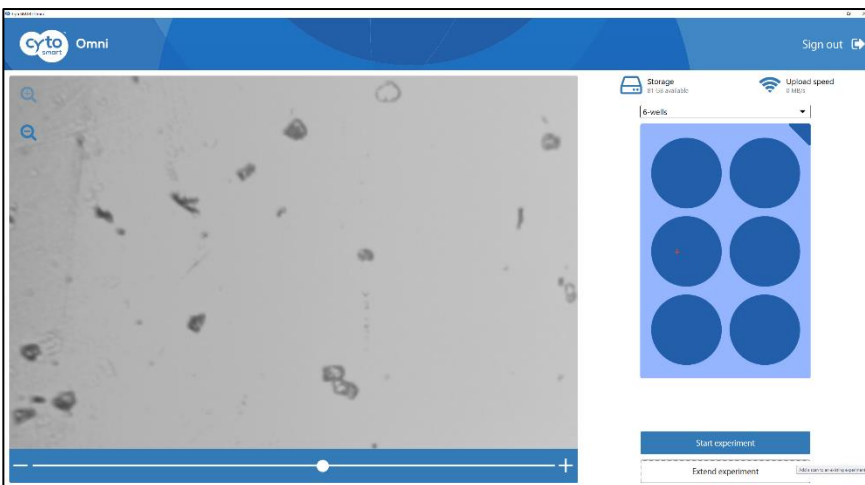


fig. 19. Click the *Extend experiment* button to add a scan to an existing experiment.

You will be led to the *Extend experiment* page (fig. 20), where you can select the experiment to which you would like to add the scan. The list of experiments is a list of all experiments that contain one or multiple single scans that were made with the selected culture vessel type.

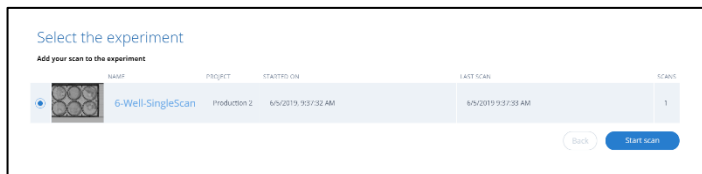


fig. 20. Click the *append scan* button to add a scan to a particular experiment.

In case you have not made any single scan with this type of culture vessel before, this list is empty and you cannot add a scan to an experiment (fig. 21). Click the “back” button to go back to the *Experiment* page (fig. 19) and start a new single scan experiment by clicking the “Start experiment” button. You can add a scan to this single scan experiment at a later timepoint.

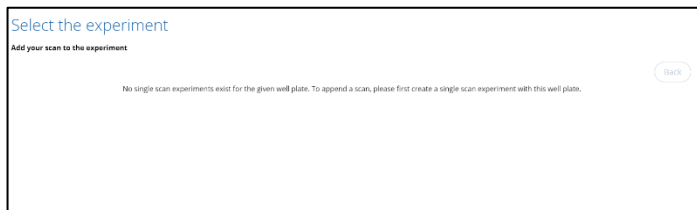


fig. 21. There are no experiments to which a scan can be added. Click the “back” button.

## 6. Connecting to the Cloud

One of the coolest features of the CytoSMART® Omni is that the experiment results can be accessed through the CytoSMART® Cloud, so you can monitor the progress of the experiment in real time. If you want to access the cloud, you need a PC, tablet or other device with a web browser, an active internet connection and your CytoSMART® Cloud login details.

After starting an experiment, the captured images will be stored in the cloud. To allow for this, make sure the system has an active internet connection. All time logs in the cloud are set to GMT.

### Login to the cloud

After starting or ending an experiment, a confirmation email is sent that contains a link to the cloud. If you did not receive a confirmation email, please check your spam folder. Alternatively, go to <https://cloud.cytosmart.com/> to log in and view your projects and experiments. This link will lead you to the *CytoSMART® Cloud login page* (fig. 22). Log in using the credentials you created earlier. If you have multiple customer environments, choose which environment you would like to access (fig. 23).

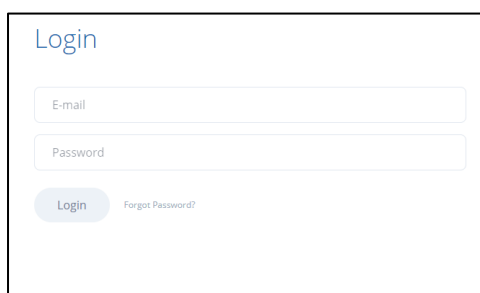


fig. 22. Cloud login page, use your account to log in.

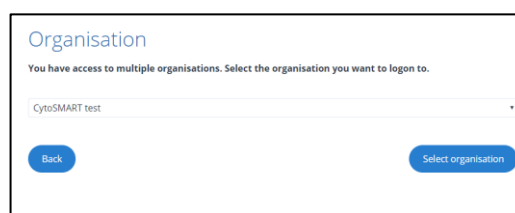


fig. 23. Choose a customer environment.

### Project overview

After logging in to the Cloud, you will get access to an overview of all projects (fig. 24A). If desired, the tile mode of the *Project overview page* can be changed to a list mode (fig. 24B) using the list icon (fig. 24a). Navigating the portal is simple. If you have multiple projects in an account, use the search bar (fig. 24b) to quickly search for a project. To create a new project, select “New Project” (fig. 24c). This is similar to beginning a new project, as described above. It is not possible to start an experiment from the cloud. To access a project and all its assigned experiments, click on the project tile (fig. 24d). Advanced features can be found after clicking on the three dots (fig. 24e). A new menu opens with the options to share the project (arrow icon), edit project details (pencil icon) and delete the project (waste bin icon).



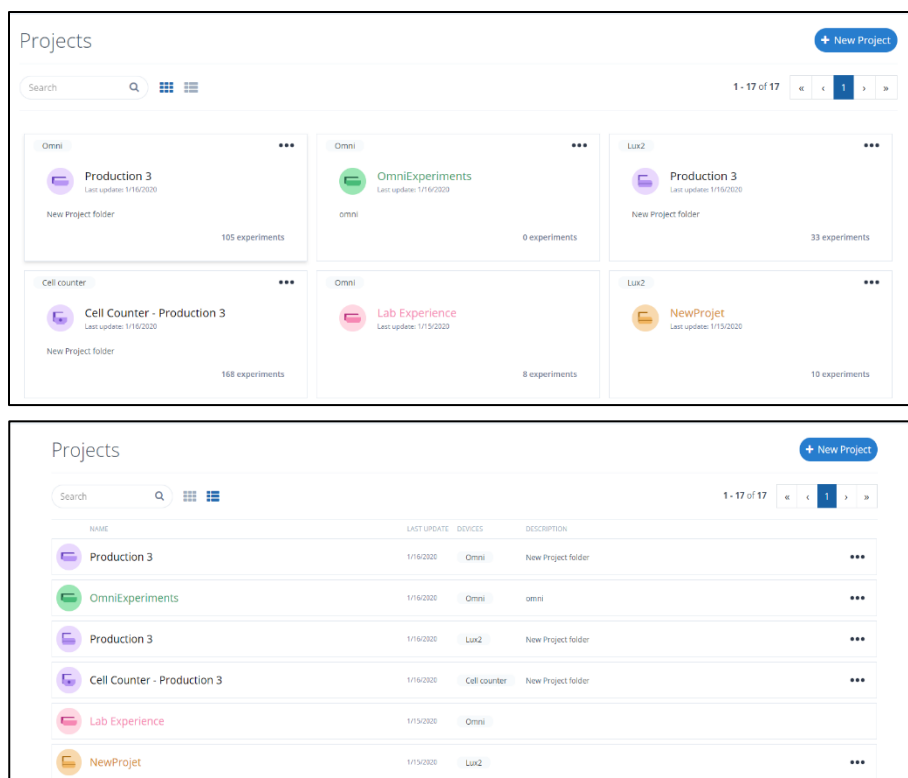


fig. 24. Project overview in tile mode (A) and list mode (B). a) Switch between the modes using the tile and list icon. b) Search projects, c) create a new project, d) open project and e) advanced features.

## Experiment overview

After selecting a project, you will get access to an overview of all experiments assigned to that project (fig. 25A). If desired, the experiments can be shown in list mode (fig. 25B) using the list icon (fig. 25a) Search for a specific experiment using the search bar at the top left (fig. 25b). At the top right, you can open an overview of the project data (fig. 25c) and share the project by clicking the “Share project” button (fig 25d). Select a specific experiment by clicking on the experiment image or name (fig. 25e). This will bring up the experiment page of that specific experiment. Click the three dots to access the advanced features (fig. 25f). In the new menu, you can choose to move the experiment to a different project (arrow icon), edit the experiment details (pencil icon) or delete the experiment (waste bin icon).

## Experiment results

After you select a specific experiment, an overview of the data collected during that experiment will be presented in the *Experiment* page (fig. 26). In the next few pages, you will find an overview of the tabs, panes and buttons in this *Experiment* page.

The experiment page contains:

- the *Map view* page,
- the *Quantitative data* page of the confluence, scratch or colony data.



fig. 25. Overview of all experiments within a project in tile mode (A) and list mode (B). a) Switch between the modes using the tile and list icons. b) Search experiments, c) project details, d) share the project, e) open experiment and f) advanced features.

## Map view page

In the map view page (fig. 26) you find overview images of each scan made during the experiment.

- Use the slider bar at the bottom to go through the different time points. (fig. 26a)
- You can zoom in and out by scrolling or clicking the plus and minus signs on the left (fig. 26b).
- Click on an area (outline is highlighted when you hover over the area) to go to the *Area page* of that area. The *Area page* is explained in detail below.
- On the left, you can also find the buttons to go to full screen mode and to print the image (fig. 26b).
- Click and drag the image to move it.
- Use the drop down menu on the top right (fig. 26d) to obtain an overlay of the analyzed data in green (confluence), blue (scratch) or orange (colony).
- Click the ruler icon (fig. 26e) to enable a measuring tool. Click, move the mouse, and click again. A blue line will appear and the distance between the two points is indicated.

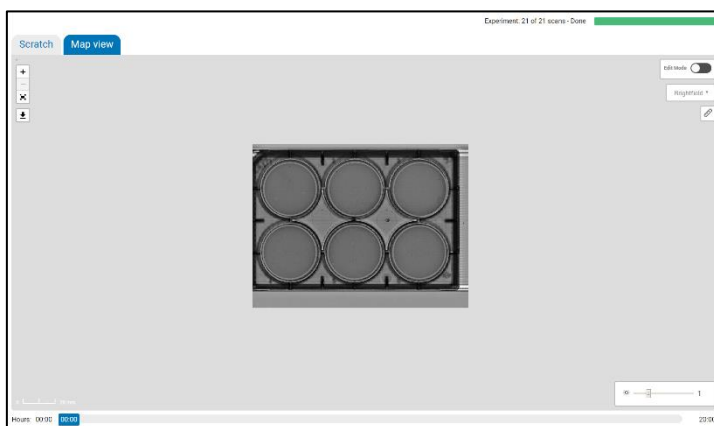


fig. 26. Map view page. Zoom in and pan through the scan. Use the slider bar to go through different timepoints (a). b) Zoom, full screen and print buttons, c) edit mode button, d) dropdown menu for an overlay of the data, e) ruler and f) brightness slider.

- Use the brightness slider on the bottom right (fig. 26f) to adjust the brightness of the image.

In case colony analysis was selected upon the start of the experiment, some extra features are available in the map view:

- The number of colonies in each area is displayed in circles on the map view (a in fig. 27A).
- Upon zooming in, individual colonies are outlined in blue (fig 27B).
- Click on a colony to view the information (area, circularity and perimeter) of that specific colony (fig. 27C).
- Gates can be applied to the colonies based on size, circularity and perimeter to select the appropriate colonies (fig. 27b).
- Save the gates for the experiment by clicking on the “Save gating” button (fig. 27c).

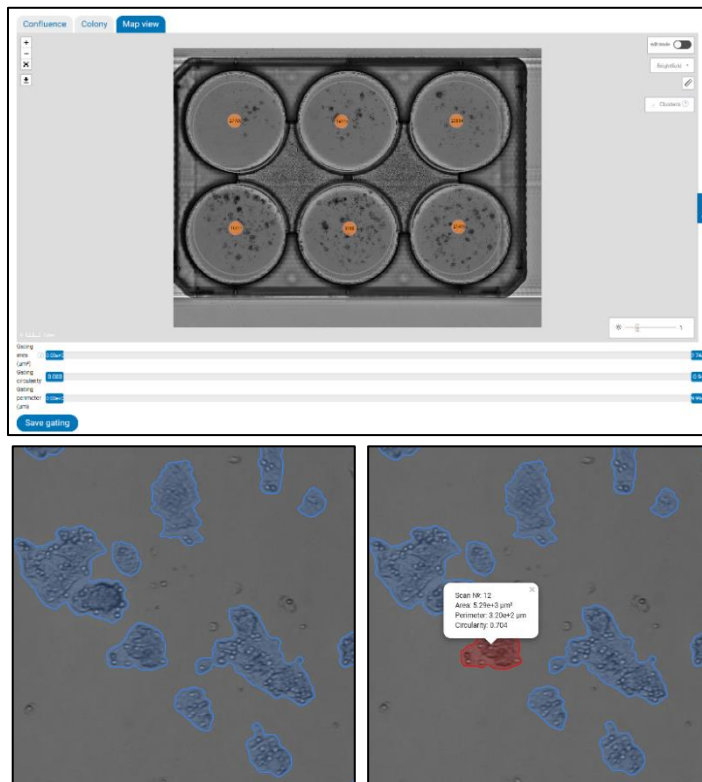


fig. 27. Colony options in the map view page. A) The number of colonies is displayed in circles (a) on top of each area. b) Gating based on size, circularity and/or perimeter can be applied to select the appropriate colonies. c) Save the gate settings for the experiment. B) Upon zooming in, individual colonies that fall within the gate settings are outlined in blue. C) After selecting a colony, the information of that colony is displayed in a text box.

### Edit areas

After toggling on the edit mode (fig. 26c), you are led to the *Edit areas* page (fig. 28A). In this page you can draw custom areas in the scan that (also) need to be analyzed. This is especially useful when you use any vessel other than well plates. You can draw areas on top of the predefined well areas if necessary.

- Zoom in and out, and move the image as described above.
- Click the circle, rectangle or polygon tool on the right (fig. 28a) to draw areas on the scan. Create a circle or rectangle by clicking and dragging your mouse. Create a polygon by clicking multiple times on the image. Close the polygon by clicking on the green start node.
- Click on an area to edit it using the square handles that appear after selection (fig. 28e). Move the area by clicking and dragging. Delete the selected area by using the delete button or the waste bin icon in the list of shapes (fig. 28f).
- Copy, cut and paste an area by using the Ctrl + C, Ctrl + X and Ctrl + V keyboard shortcuts. The areas will be pasted at the current position of the cursor. You can also right-click on the area and subsequently select the copy, cut or paste option.
- Multiple areas can be selected simultaneously by using the group selection mode (fig. 28b). Select the areas that need to be grouped by clicking and dragging a box around the areas or by holding the Ctrl key and clicking the areas. The selected areas are indicated by a green outline (fig. 28B).

- Grouped areas can be moved, copied and pasted in the same way as individual areas.
- All manipulations to the areas can be undone or redone using the undo and redo buttons on the top right (fig. 28b).
- Edit the names of the shapes in the area list (fig. 28d) by clicking on the pen icon. Save the name using Enter or by clicking on the save icon.
- Analyze the areas by clicking the “Process areas” button (fig. 28c). You are led to the *Submit selected areas* page (fig. 29) where you can select the type of analysis you would like to perform. Subsequently click the “submit” button to analyze the areas. All scans that are added to the experiment after creating the new areas will be processed. In case you only want to analyze the timepoint in which the areas are drawn, tick the preview checkbox.

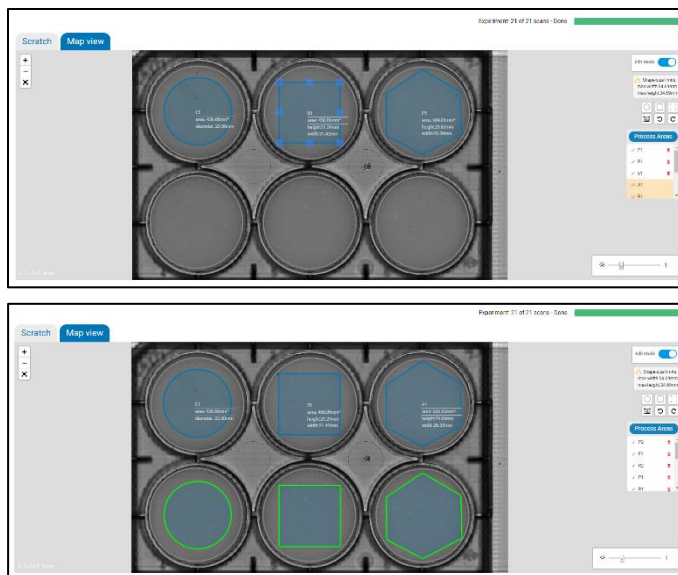


fig. 28. Edit areas page (A). Draw areas in the scan that you would like to analyze. a) Circle, rectangle and polygon tools. b) Group selection, undo and redo buttons. c) Process area button and d) list of created areas. Drawn areas can be edited using the square handles (e). Edit the names of the areas and delete areas using the tools in the list (f). (B) Grouped areas are outlined in green.

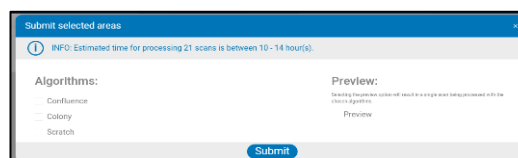


fig. 29. Select the type of analysis you would like to perform on the created areas.

### Quantitative data page

Next to the map view page, the experiment page also contains a tab (or multiple tabs) containing the quantitative data of the selected algorithm(s). The quantitative data page contains:

- Confluence, scratch or colony graphs (fig. 30a),
- buttons to refresh the data and to download an Excel-file of the results of all areas at each timepoint (fig. 30b),
- a button to clear the selected areas (fig. 30c),
- an overview image of the scan in which areas can be selected (fig. 30d),
- a drop-down menu to go to the *Area page* (fig. 30e) and
- a button to group areas (fig. 30f).

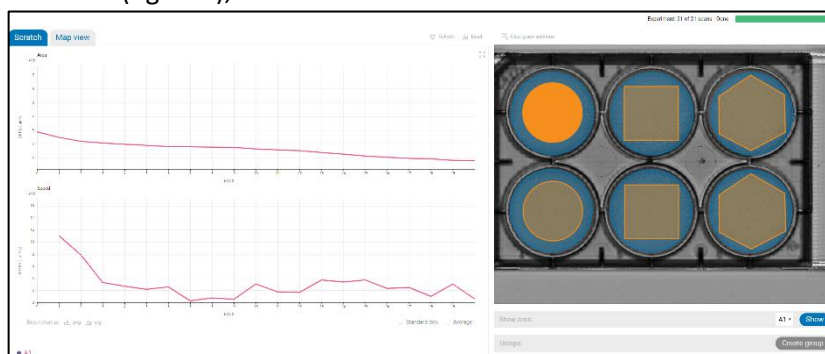


fig. 30. The experiment page contains a) graph pane(s), b) refresh and download buttons, c) clear graph selection button, d) scan overview image, e) drop down menu to go to single area experiment page and f) group areas button.

### Graph pane

In the graph pane (fig. 31), the analyzed data (confluence, scratch area & migration speed, count, size and circularity of colonies) is plotted against the duration of the experiment. Download the graph(s) using the buttons on the bottom left. Tick the check boxes on the bottom right to calculate and plot the average and standard deviation of the selected areas.

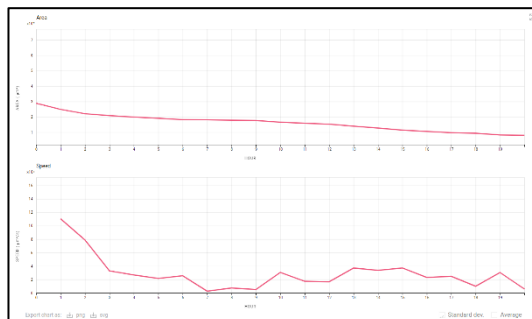


fig. 30. Graph area. The analyzed data is plotted against the duration of the experiment in hours.

### Scan overview pane

In the scan overview pane (fig. 30), the wells of your well plate are displayed as transparent blue circles. The areas that you have edited yourself are displayed as transparent orange shapes. Select an area by clicking on it or select multiple areas by clicking and dragging. The selected areas become opaque and the data is displayed in the graph.

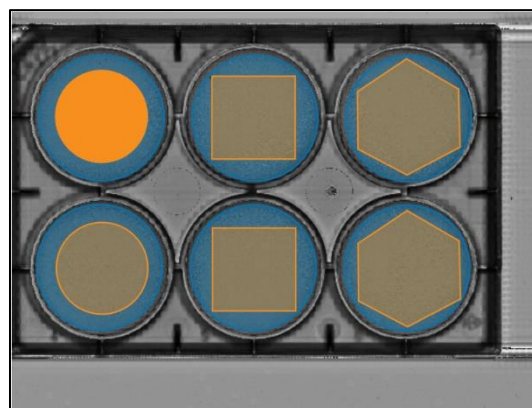


fig. 32. Scan overview area. Select the areas of which you want to see the graph.

### Group areas

When you have selected several areas, you can group them by clicking the “create group” button. You are led to the *Create group* page (fig. 33). Just name the group, assign a color to it using the slider bars and click the “Create group” button.

The edges of the grouped areas are now displayed in the assigned color in the *Scan overview* pane and an average  $\pm$  standard deviation graph of the data is shown.

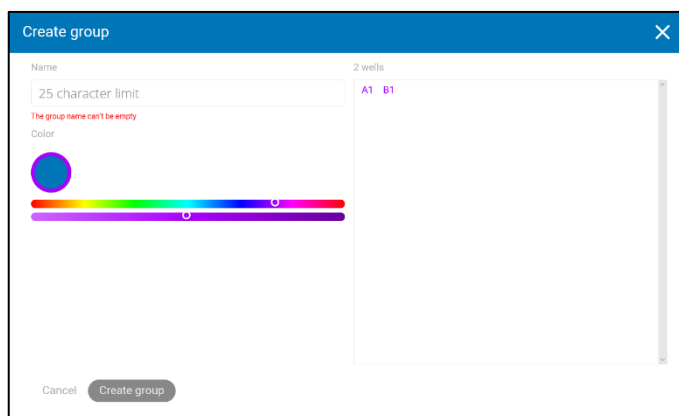


fig. 33. Create a group by naming the selected areas and assigning a color to them.

### Area page

Select the area you would like to visualize in the drop down menu below the scan overview area and click the “Show” button. You will be led to the *Area page* (fig. 34). You reach the area page by clicking on the area in the map view (see above). The *Area page* contains the following panes and buttons:

- Time-lapse movie pane (Fig 34a): A time-lapse movie of the selected area is shown here. You can choose between brightfield and the analyzed movie by clicking the tabs at the top left. You can control the playback mode of the movie by the slider bar and the buttons below the image (play, pause, forward one image, backward one image). Adjust the speed of the time-lapse movie with the “Turtle-Cheetah” slider. Click “Open image” to open the full-size image in a new browser tab. Downloaded movies and images will be sent to the person who performed the experiment via email.
- Graph pane(s) (fig. 34b): In these pane(s), the quantitative data is plotted against the duration of the experiment. Dependent on the selected analysis method, the confluence (fig. 35A), scratch area and migration speed (fig. 35B) or number of colonies, average colony size, average colony circularity and circularity vs. size (fig. 35C) are plotted.
- Experiment pane (fig. 34c): Here, you find an overview of the experiment settings, containing the start and end date, duration, owner, scan interval and number of scans.



fig. 34. The *Area page* consists of a) time-lapse movie pane, b) graph pane(s) and c) experiment pane

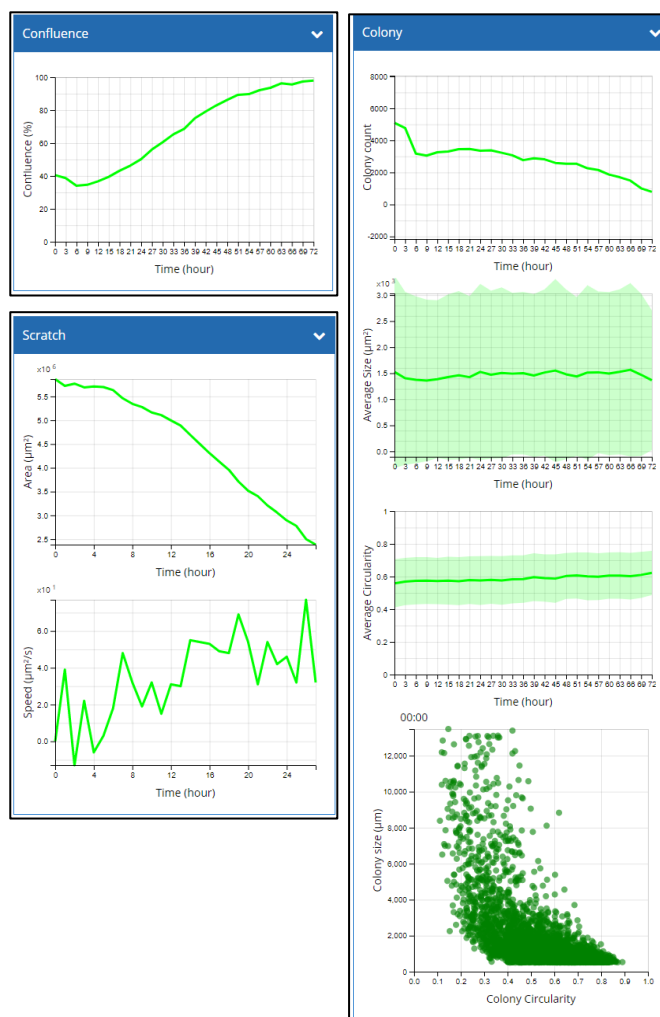


fig. 35. The graph(s) pane contains the quantitative data of A) confluence analysis, B) scratch analysis and/or C) colony analysis.

## 7. Cleaning and troubleshooting

### Cleaning and maintenance

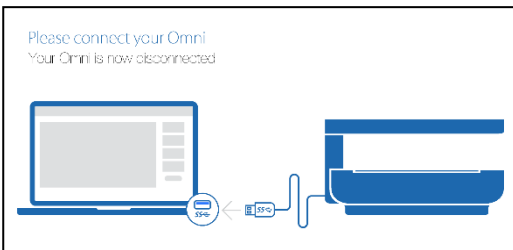
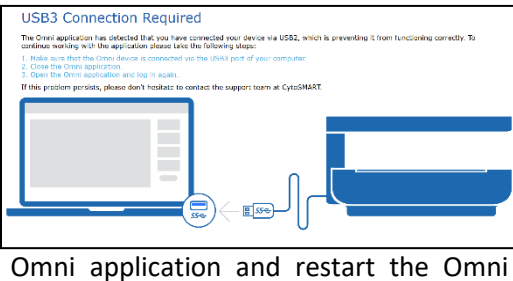
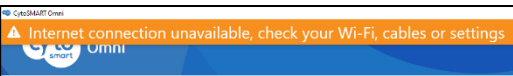
Lucky for you, the CytoSMART® Omni requires minimal cleaning for reliable operation. Unplug the USB and power cables before cleaning the device. Use a damp, lint free wipe to clean the outer case with isopropyl alcohol (IPA) or (70%) ethanol.

If the optical window is dirty or contains dust, clean it using a soft, lint free wipe. You can use IPA or ethanol in case the optical window needs to be cleaned thoroughly. Do not use abrasive chemicals or rough materials to clean, as this may scratch the optical window. A scratched optical window can be repaired but this is not included within the product's warranty.

**Important:** Do not use acetone to clean the CytoSMART® Omni. Also, do not autoclave the CytoSMART® Omni, this will result in damage to the electronics.

The CytoSMART® Omni does not need regular maintenance. Do not perform any repairs or service on the device yourself. Contact CytoSMART® if a problem should arise, via [support@cytosmart.com](mailto:support@cytosmart.com) or via the live chat function in the software or cloud.

### Troubleshooting

<b>Decrease in brightness over time</b>	<p>When the captured images become darker over the duration of the experiment, this is likely caused by condensation on the inside of the lid of the culture vessel. The condensation can be prevented by flushing the inside of the lid with sterile 0.5% Triton-X 100 in PBS solution. Make sure the entire inside of the lid is covered by the solution, aspirate the solution and let it air dry. Make sure the solution has evaporated before placing the lid back on the vessel.</p>	
<b>No USB connection</b>	<p>When you receive an error message that the CytoSMART® Omni is not connected to the laptop via USB, make sure the USB cable is properly connected at both the USB port in the CytoSMART® Omni and in the laptop. Try to unplug and plug in the cable if necessary.</p>	
<b>USB3 connection required</b>	<p>In case you have connected the CytoSMART® Omni to the laptop via a USB2.0 port, it will not function properly, and you will receive an error message. Plug the USB cable in a USB3.0 port (recognizable by the superspeed logo and/or a blue bar), close the Omni application and restart the Omni application.</p>	
<b>No internet connection</b>	<p>When this message appears, the laptop has no active internet connection. Without an internet</p>	

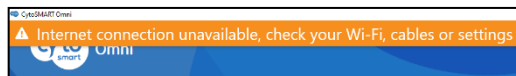
connection, the system cannot connect to the CytoSMART® Cloud. To resolve this, try the following:

1. Make sure there is an active internet connection.
2. Reboot the laptop.
3. Verify there is an active internet connection by opening a website.
4. If no website is loading, verify the internet connection on another device.

If your internet connection is working correctly but the message remains, contact your IT department for further assistance in accessing an internet connection. Otherwise, please contact our support via [support@cytosmart.com](mailto:support@cytosmart.com).

**No internet connection warning while there is an internet connection**

When this message appears when you do have an internet connection and are able to use your webbrowser normally, it may be possible that your network uses proxy for connecting to the internet. Please contact CytoSMART with the proxy details (IP-adress and password) and our support team will help you configure the right proxy settings.



**Camera module is not moving**

When you plug in the USB cable before you plug in the power cable, this could affect the x,y-movement of the camera module. Follow these steps to solve this:

1. Close the Omni application.
2. Unplug the USB cable from the laptop and power cable from the socket.
3. Plug the power cable back into the socket
4. Plug the USB cable back into a USB3.0 port of the laptop.
5. Restart the Omni application.

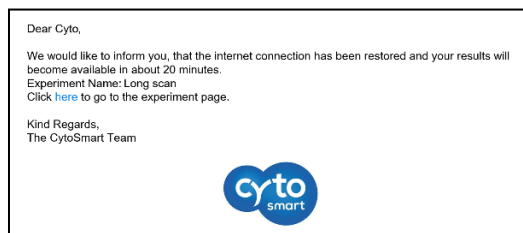
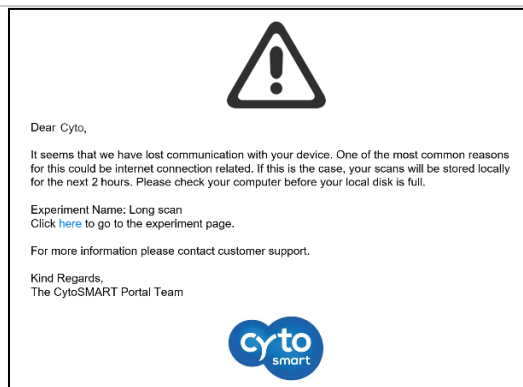
**Camera is not focusing**

When the USB cable and the power cable are plugged in in the wrong order, this could affect the ability of the camera to focus. Follow these steps to solve this:

1. Close the Omni application.
2. Unplug the USB cable from the laptop and power cable from the socket.
3. Plug the power cable back into the socket
4. Plug the USB cable back into a USB3.0 port of the laptop.
5. Restart the Omni application.

**Communication is lost**


In case the communication with the CytoSMART® Omni is lost during an experiment, you will receive a warning email, such as the example on the right. In case the communication is lost, the scans cannot be uploaded and are stored locally until the communication is restored or until the disk is full. Most likely the communication is lost due to internet connection issues. Make sure there is an active internet connection. If the connection is restored, you will receive a confirmation email that the communication has been restored.





### Slow internet connection

In case there is a slow internet connection, (part of) the scans need to be stored locally which might result a lack of disk storage space. You need a minimum upload speed of 0.5 Mbit/s. To obtain a higher upload speed you can change from WiFi to an ethernet connection via cable or disconnect other devices from your WiFi network.




Dear Cyto,

Our monitoring system detected a slow internet connection which can affect the delivery time of the experiment results. A part of the scans will be stored locally which may result in your disk running out of space. We estimate that your disk will fill up in 214 hours.

Experiment Name: Long scan  
[Click here](#) to go to the experiment page.

If you would like to have more information please contact customer support.

Kind Regards,  
 The CytoSMART Portal Team



### Well detection failed

In case the analysis of your experiment has failed because the wells of your experiment were not detected properly, it could be caused by the following reasons:

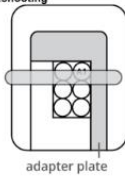
1. The wrong well plate type was selected. Check whether the selected well plate in the application is the same as the one on the CytoSMART® Omni. If not, restart your experiment and select the correct well plate.
2. The well plate is not placed on the CytoSMART® Omni correctly. Make sure well A1 is placed in the corner of the adapter plate and restart your experiment.
3. The background is too bright. If there is not enough contrast between the well plate and the background, the wells cannot be detected. Make sure the CytoSMART® Omni is in a closed incubator and start a new experiment.

Dear Cyto,

The analysis of your Omni experiment has failed because we were unable to detect the wells within your well plate. This might have been caused by one of the reasons listed below. Please take a look at your image and compare it with the examples presented below, to find a possible solution for the failed analysis.

[Click here](#) to see your image.

**Troubleshooting**



adapter plate

Figure 1

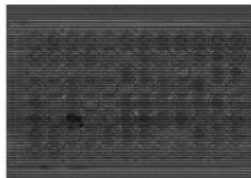


Figure 2

Cases:

1. Please check whether you have selected the correct well plate. If not, please restart your experiment and select the correct well plate type.
2. Please check whether your culture vessel is placed on the Omni correctly. The well plate should be placed with well A1 in the corner of the adapter plate (see Figure 1). Place the well plate on the Omni correctly, stop your current experiment and start a new one.
3. Please check whether the background of your scan is not too bright. If the background is too bright (see Figure 2), the wells cannot be detected. Place the Omni in a closed incubator and start a new experiment.

Kind Regards,  
 The CytoSMART Portal Team

## 8. Technical specification

Unit dimensions	396 x 345 x 171 mm (L x W x H)
Weight	9 kg
Optics	Brightfield with digital phase contrast
Magnification	10x fixed objective
Light source	LED
Camera	5 MP CMOS
Scan area	99 x 131 mm
Exported formats	png, mp4, xlsx
Well plate types	6 – 96-well plates
Culture flask types	T25 – T225, hyperflask and triple flasks
Other labware	Anything transparent and lower than 55 mm
Data storage	Online in the CytoSMART® Cloud
Operating environment	5-40°C, 20-95% humidity
Support	Via mail and live chat
Minimal system requirements	Windows 10 2.4 GHz i5 CPU 8GB of RAM 250GB of free drive space USB3.0 connection Internet connection (0.5 Mbit/s upload speed)

## 9. Warranty

The CytoSMART® Omni is covered by warranty - if the device is properly used and installed - for a period of one year (1 year) from the date of purchase. If any defects occur during this warranty period, CytoSMART® will repair or replace the defective parts at its discretion without charge.

The following defects, however, are specifically excluded:

1. Defects caused by improper operation.
2. Damage caused by accident or misuse.
3. Damage caused by autoclavation of the device.
4. Damage caused by the sterilization cycle of an incubator.
5. Repair or modification done by anyone other than CytoSMART® or an authorized agent.
6. Damage caused by substituting alternative parts.
7. Use of fittings or spare parts supplied by anyone other than CytoSMART®.
8. Damage caused by disaster.
9. Corrosion caused by improper solvent, sample or treatment of the device.

CytoSMART® cannot be held responsible for damage incurred during shipment of a defective instrument. It is recommended that you save the original packing material in which the instrument was shipped. This warranty is limited to the replacement of defective products.

For any inquiry or request for repair service, please visit us at [www.cytosmart.com/support](http://www.cytosmart.com/support) or contact our support staff via [support@cytosmart.com](mailto:support@cytosmart.com) or via the live chat in the application or cloud.