PC Sample Application

User Guide
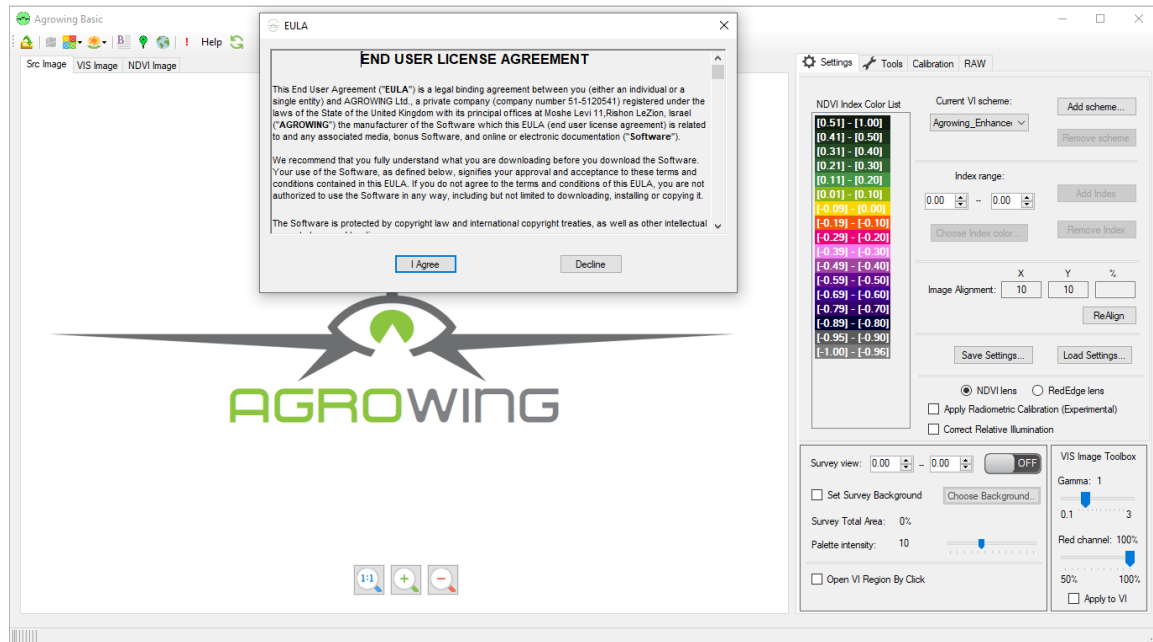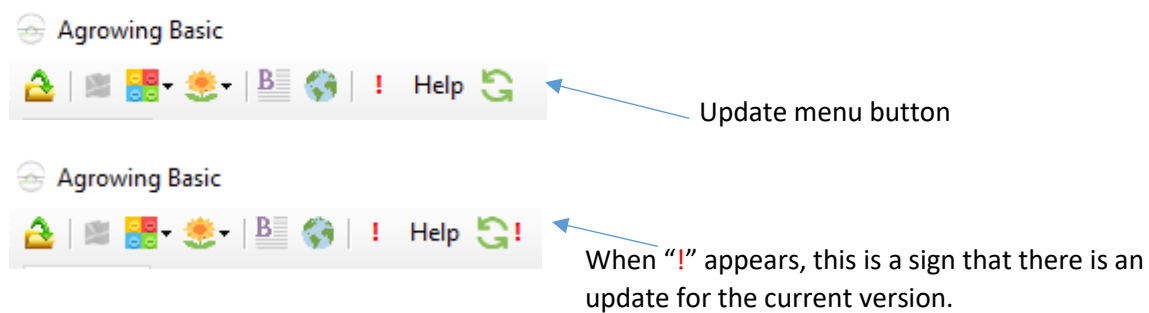
May 2023 V.1.3

Contents

Getting Started

In order to start using the application, an approval of the end user license agreement is required.

The software is compleately free for the Agrowing customers. The purpose of this software is to show the users the basic usage of high quality images produced by Agrowing multispectral lens.

Update Notes.

Update menu button

When "!" appears, this is a sign that there is an update for the current version.

Updates are checked automatically every week, user also can check it manually by pressing the Update button on the top toolbar menu,you must have an internet connection during update checking and update process.

Updates are downloaded to user computer from secured site, extracted and old files are overwritten, at the end of the process updated Agrowing Basic application reopened.

All instances of the Agrowing Basic application should be closed in order to update the version.

Agrowing Basic Application's main screen includes the interface to the application's settings.

The top toolbar icons (from left to right) are: File; Load Agrowing image/video; Show location; View RGB channels; Calculate SG metrics; Batch conversion; End user license; Help.
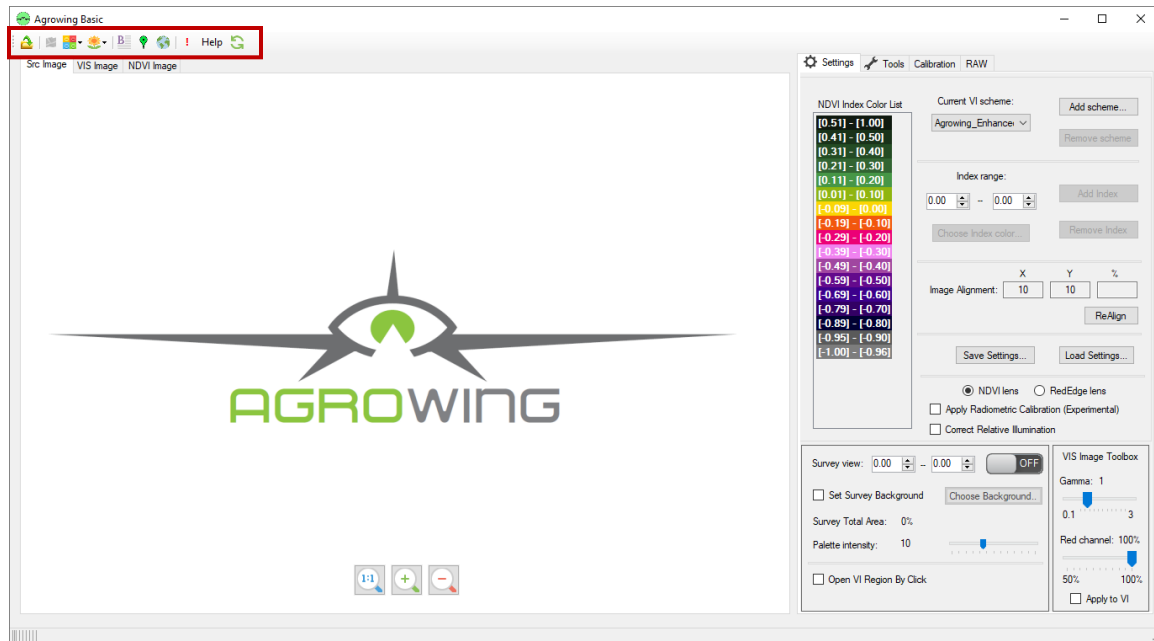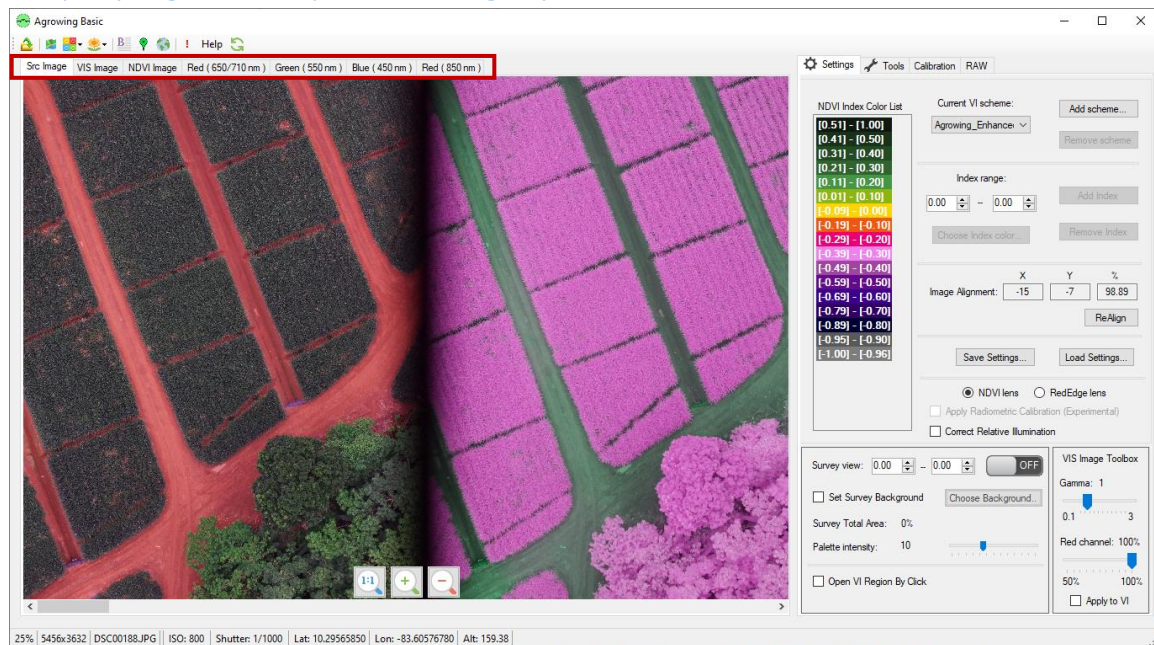

Agrowing files

Agrowing Basic Application is designed to process side by side multispectral images or video streams, which were captured using Agrowing NDVI or Red-Edge lens technology. The files can be of JPG, Tiff, BMP, PNG, AVI, MP4 and other types.
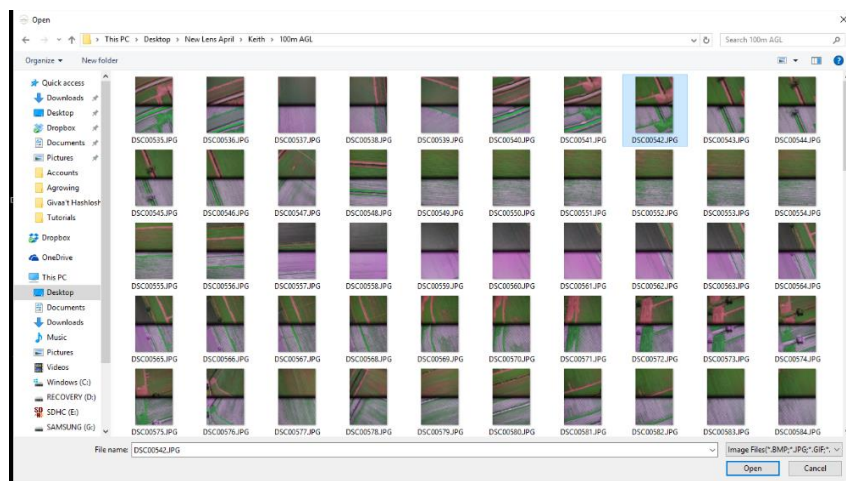
Displaying the acquired imagery

The display type can be selected by clicking on the tabs below the top toolbar. The application allows viewing the source image, the VIS part of the image, the NDVI (and other presentation of the analyzed image according to the selected metric), and the different split color channels (450nm; 550nm; 650nm/710nm; 850nm).

The software also support the A7Rii/iii/iv Full Frame – 10-14 band images

There are some differences in menus and GUI interface, but in general it is the same flow as for 4 – band sensor data.
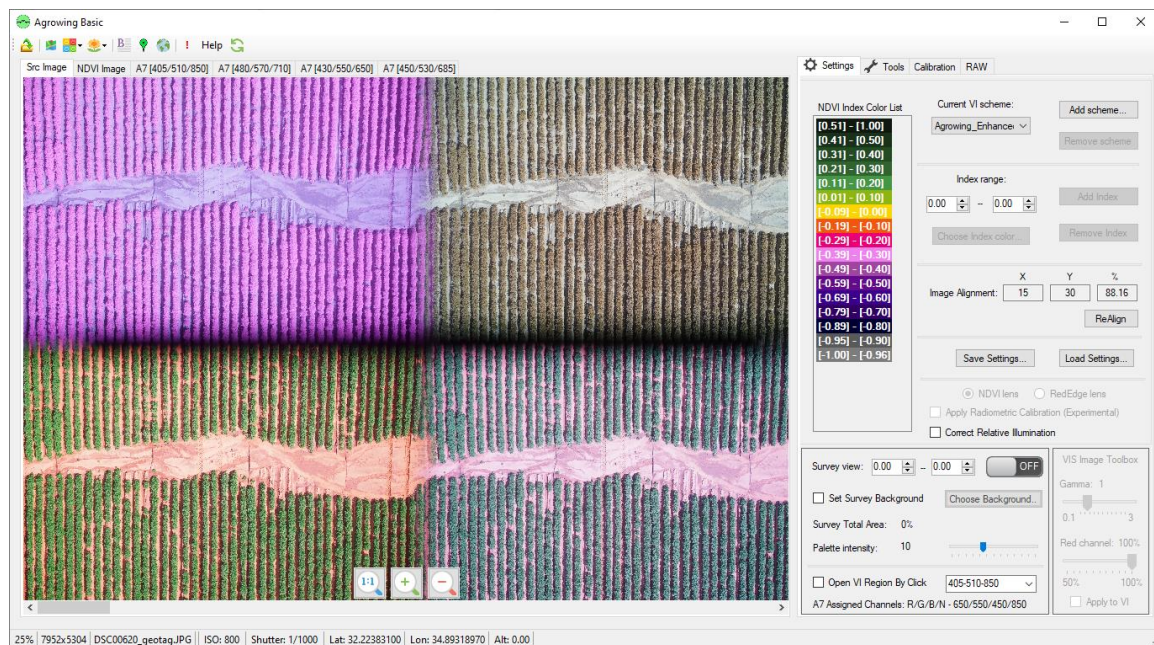
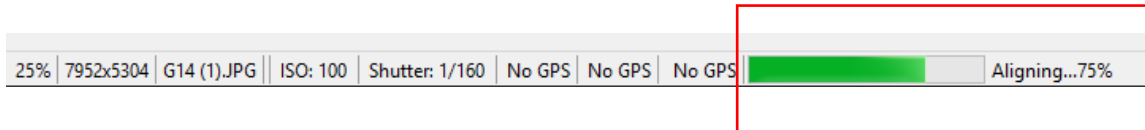When loading the A7 image please wait till the alignment is finished, you can track the progress on the status bar at the bottom of the application window.

| 25% | 7952x5304 | G14 (1).JPG | ISO: 100 | Shutter: 1/160 | No GPS | No GPS | No GPS | | Aligning...75% |

Advanced display

Clicking on the "Show Image Alignment" menu item, allows viewing combined color channels for alignment verification. Agrowing's unique lens technology provides identical green channel for continuous alignment.
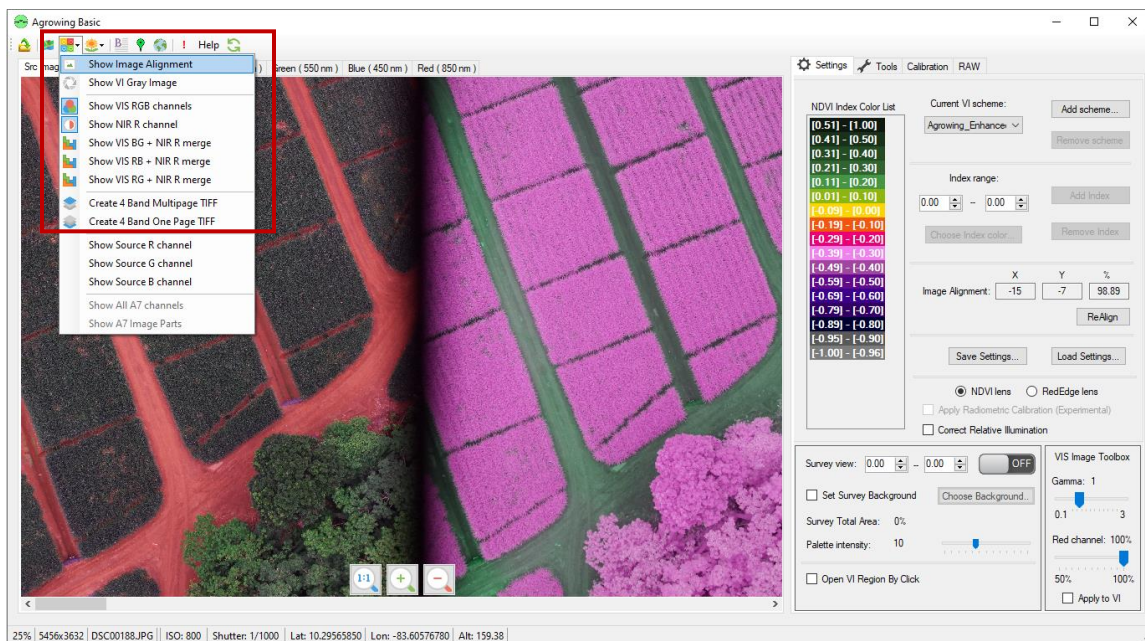
Alignment verification

The automatic alignment displays the digital correction to the hardware tolerance (which can never be pixel accurate). Clicking on the "Check mode" button, shows the actual difference and alignment quality level of the green channels of the left and right lenses, based on which the color channels are aligned.
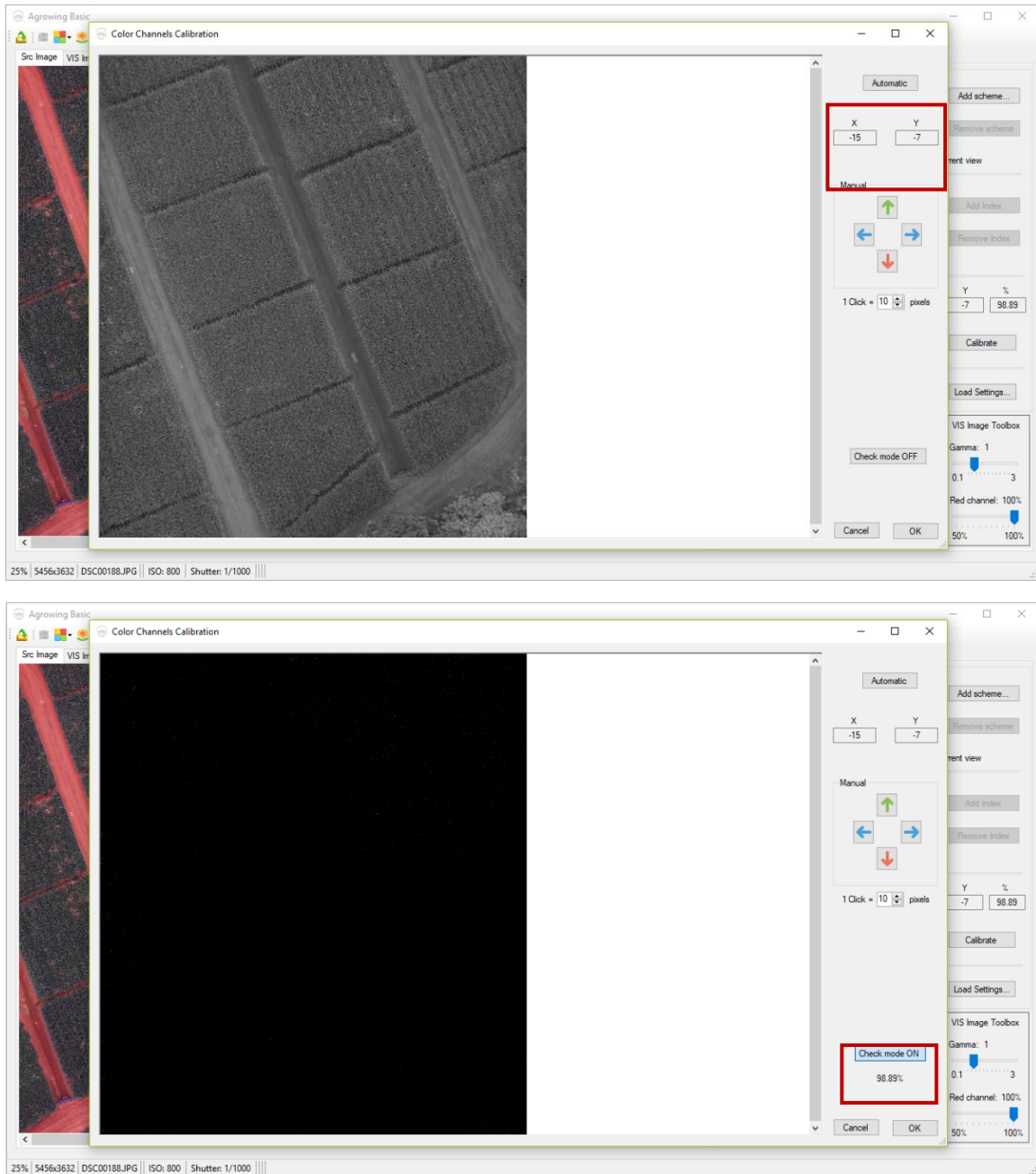
As the lenses are ~11mm apart, the digital alignment varies according to the elevation of the shooting session. The digital alignment is performed automatically whenever an image file is opened. The (X;Y) correction is also displayed on the application's main screen. In case of mis-alignment user can correct it manually by shifting images using arrows, when images are aligned correctly then press OK to save the results.

Viewing the different color channels

The application separates the color channels and allows saving them for external analysis.
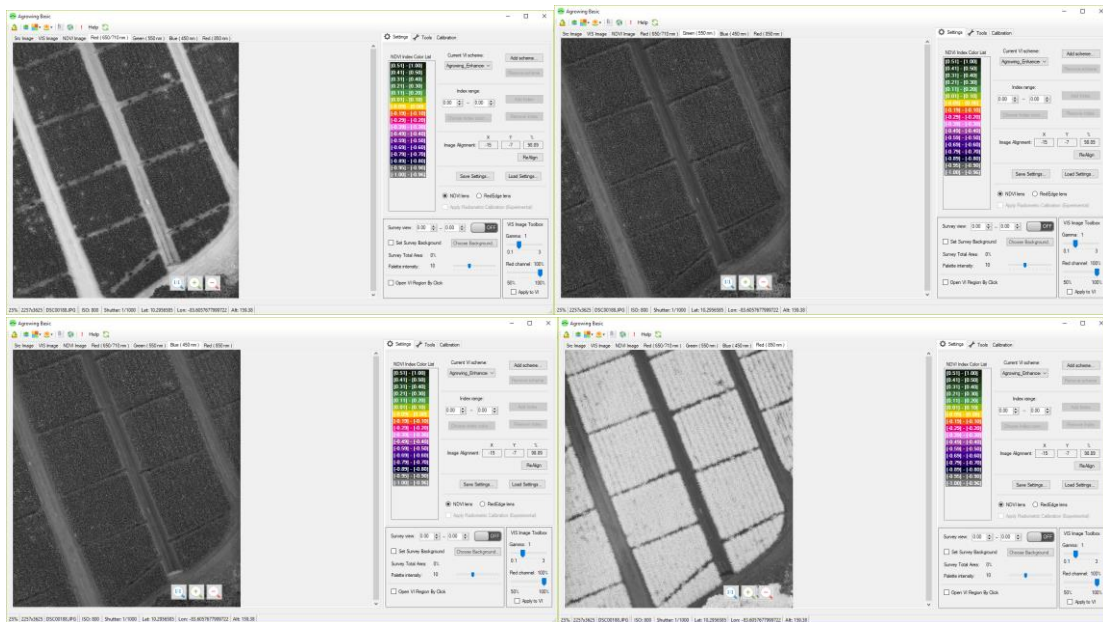
The images can be saved by right clicking on them.
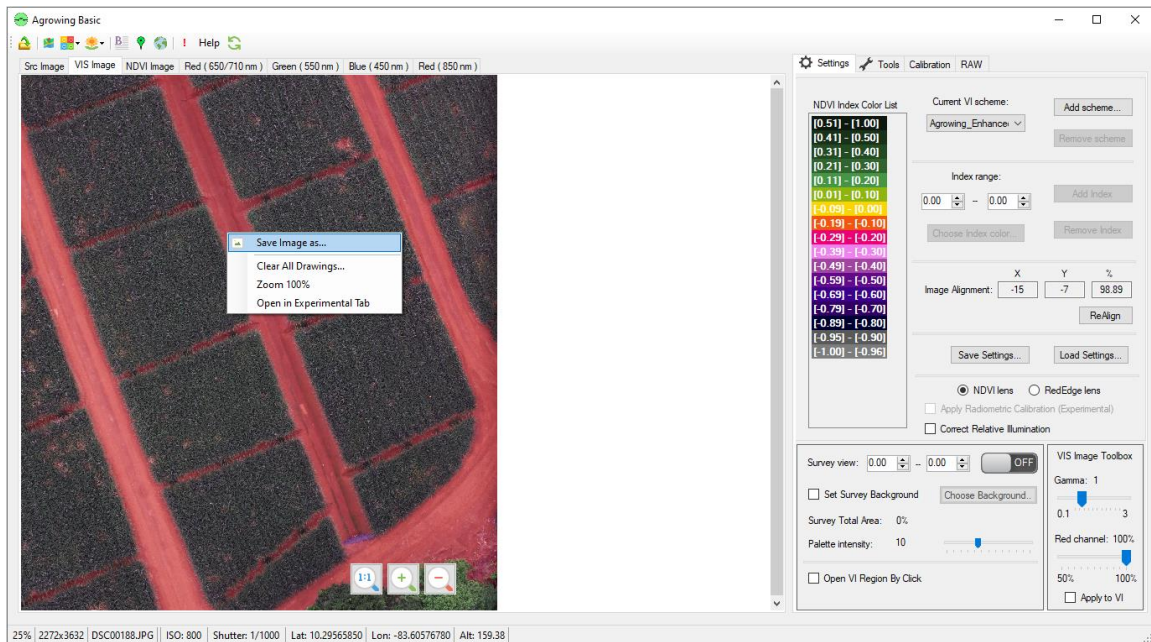
NDVI, NDRE, ARVI, OSAVI and additional metrics

Based on the lens type used during the acquisition process, many analyzing metrics are supported by the application. A simple description of the metric is shown in a box when the cursor is placed on the metric line. Clicking on the selected line will initiate the required analysis.
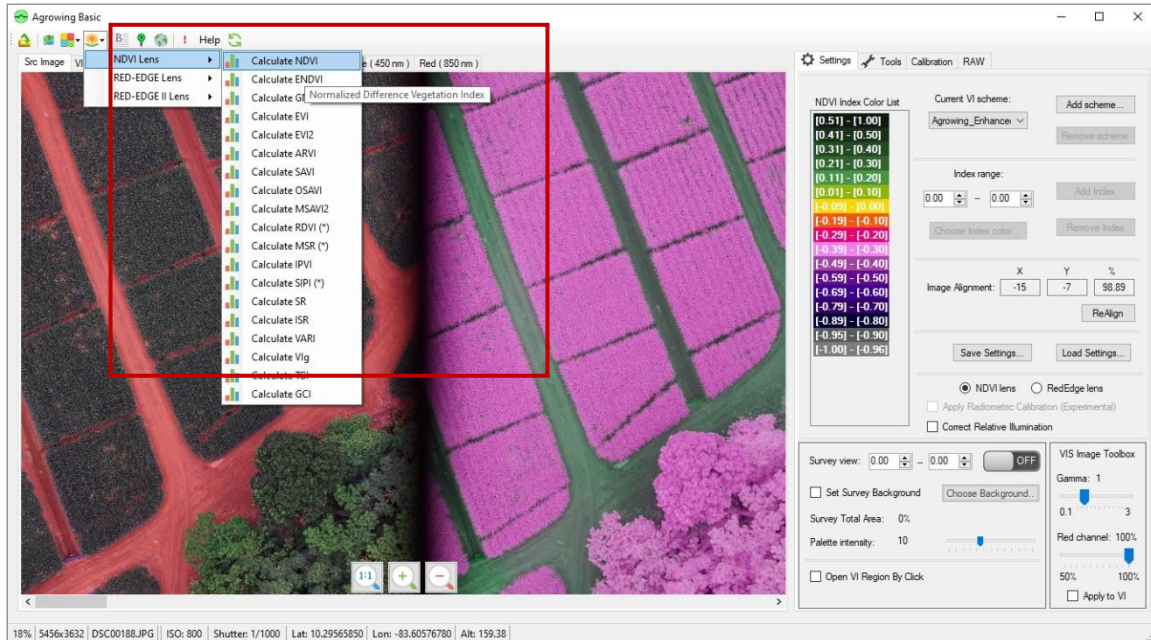
Click on the "NDVI" image to view the analyzed image. Scroll to zoom in and out.
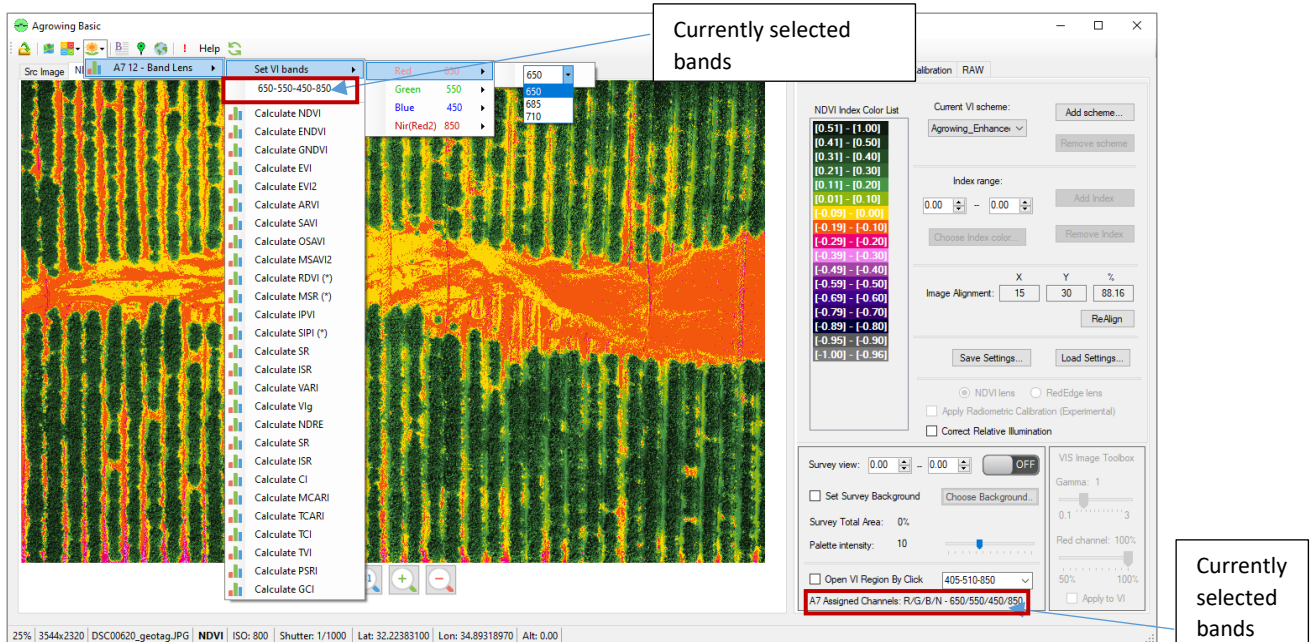
For A7 – 10-14 band sensors, before applying VI user have to choose the desired bands from list of available, and
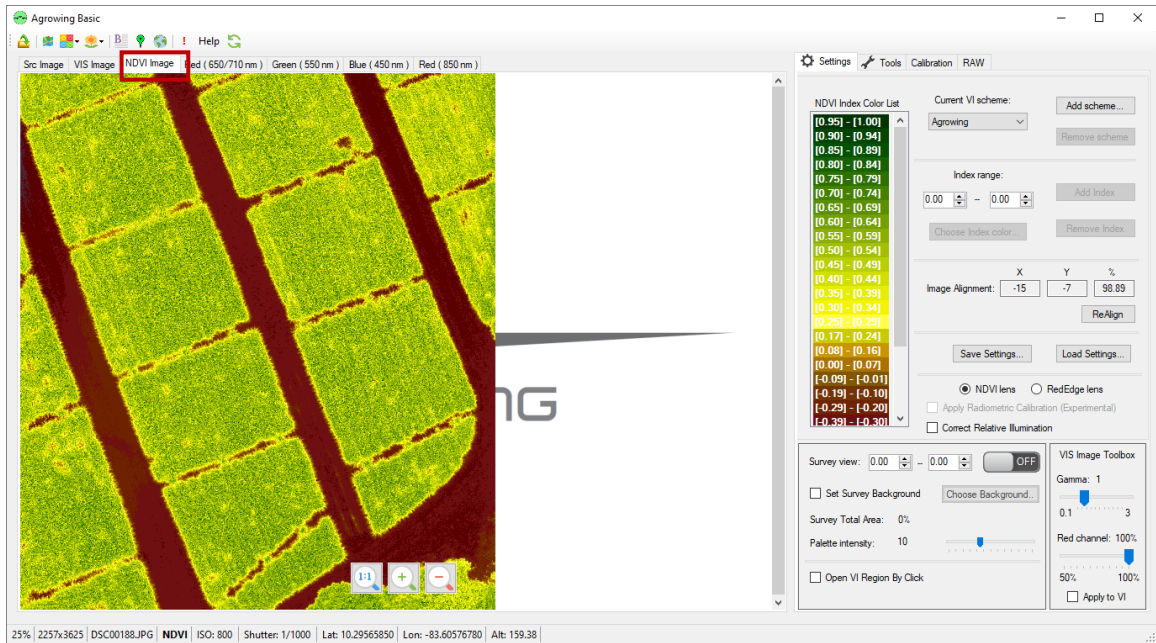
Selecting the survey's range

The application allows changing the vegetation index view range, according to chosen values.
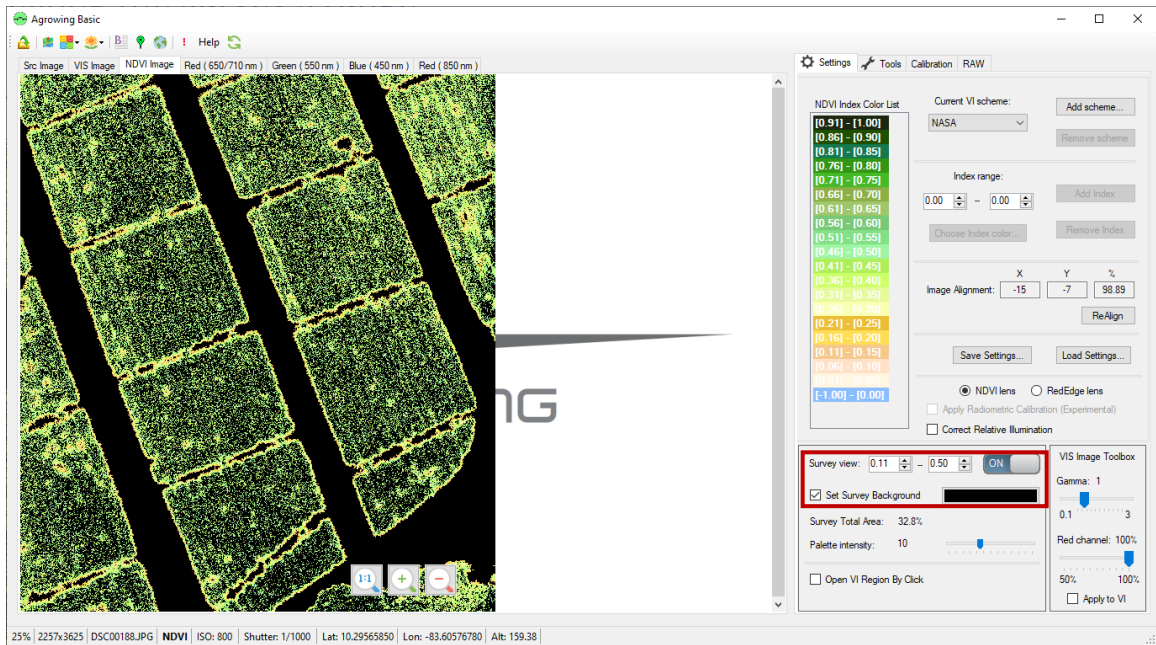
Open VI Region

By selecting this checkbox upon mouse left click within vegetation index view the corresponding RGB region of 640x480 will be open according to the center of clicked point.
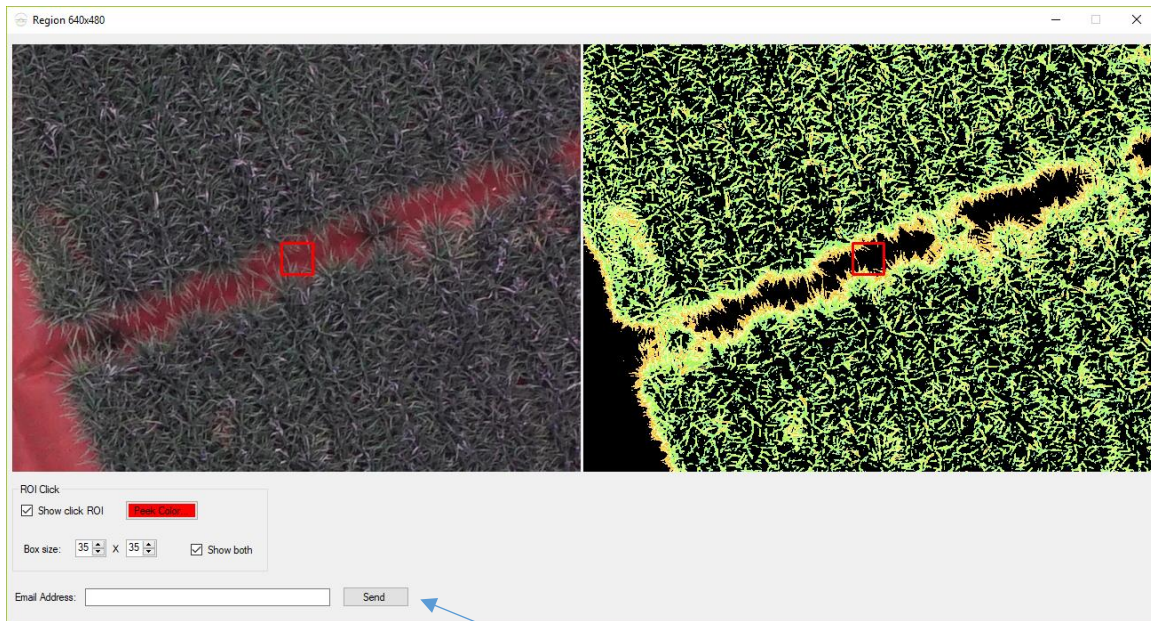
You can send an email with two images attached. Just type the address.

Palettes

The application allows selecting, customizing and adding palettes, according to the required range and survey. It also includes a few sample palettes.

The range of index colors, indices' colors, adding and removing ranges, creating new palettes, are all supported by the application. Customized indices' palettes can be saved and loaded.

In order to define a new palette, chose a pre-defined palette as a basis, and then click on "Add scheme". You'll be asked to name the new scheme in a dialog window. The name of the new scheme will be added to the schemes' drop menu. You can remove/add define the range of indices, and choose their colors. In order to save the palette, which you designed, click on "Save Settings" and save the settings file in a directory of your choice.

In case lens type not detected correctly set it manually and reload the image.

Tools Tab
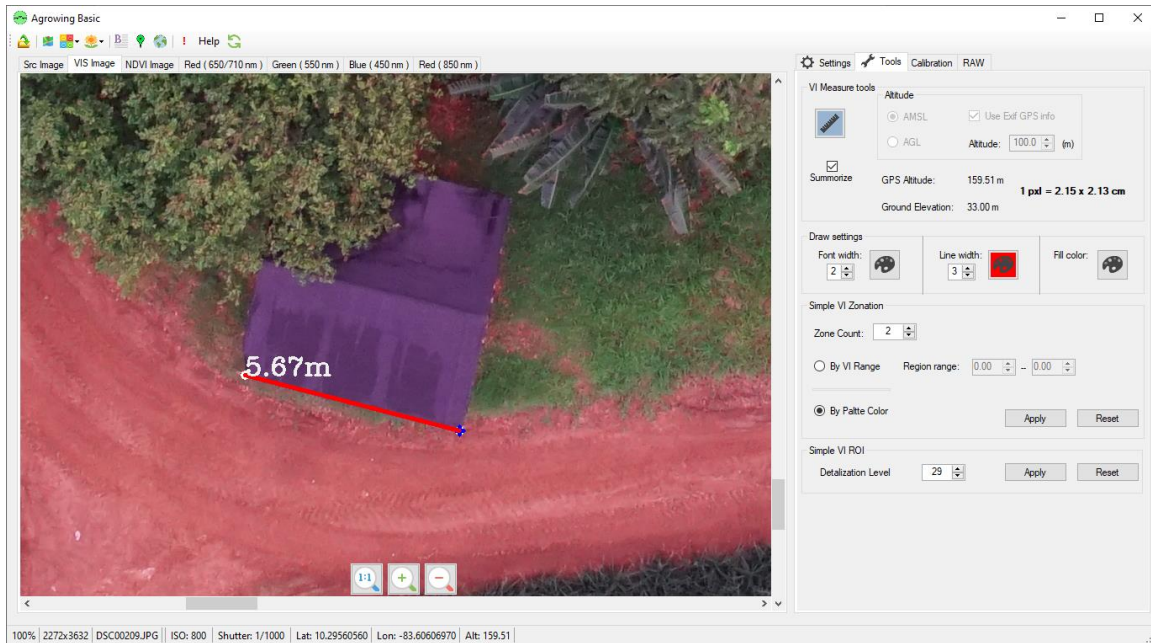
Tools tab is designed for applying different metrics to Visual part of Agrowing image and NDVI images.

User can choose the font and line color and width.

User can choose to apply manual settings or automatic which are taken from image EXIF GPS tags or combine them.

Also all the measurements are calculated with the respect to altitude and ground elevation of the GPS point if the image includes telemetry data. In case valid GPS EXIF Tag information manual setting will be disabled.

The calculation of ground elevation is done by using Google Maps Elevation service API. The valid internet connection is necessary for this feature to work properly.

Calibration Panel Tab

Currently Agrowing Basic support only X-Rite Classic 24 calibration panel for radiometric calibration and color calibration. By clicking "Load Image" you will choose the image with the panel which was taken before the flight or session. For 4 band sensors it is important to select the lens type.

Please be sure that X-Rtie panel is placed in the middle of the frame.

Select to load alignment file for this image.

Click to load Image with calibration panel.

Click to show/hide calibration image Tab

Select panel, X-Rite Greyscale or X-Rite classic or Custom panel.

Select appropriate lens type

(Only for 4-band lens)

Click to analyze the image.

By successful analysis completion the appropriate message will appear, in case that analysis fails please load another image with panel positioned in the middle of the frame.
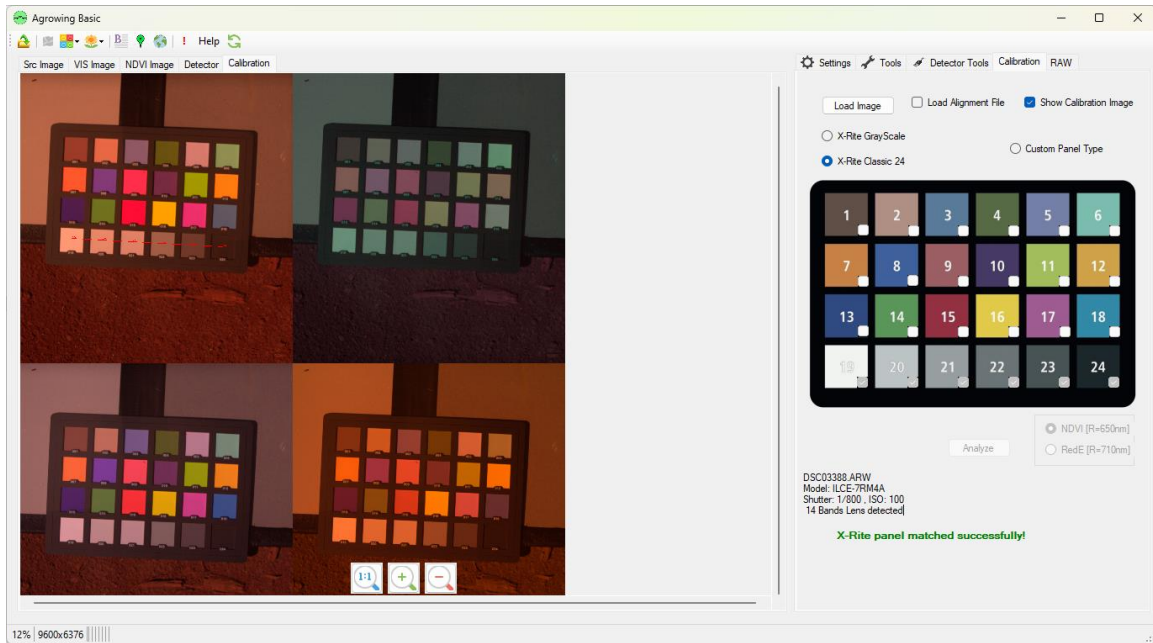
After successful panel match the option to use calibration results in Vegetation Indexes will be available.
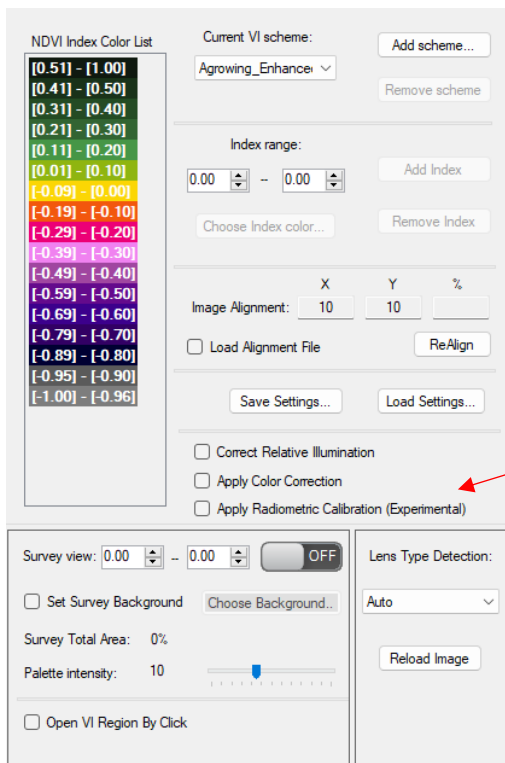
Option is available when calibration panel loaded and matched.

Custom panel
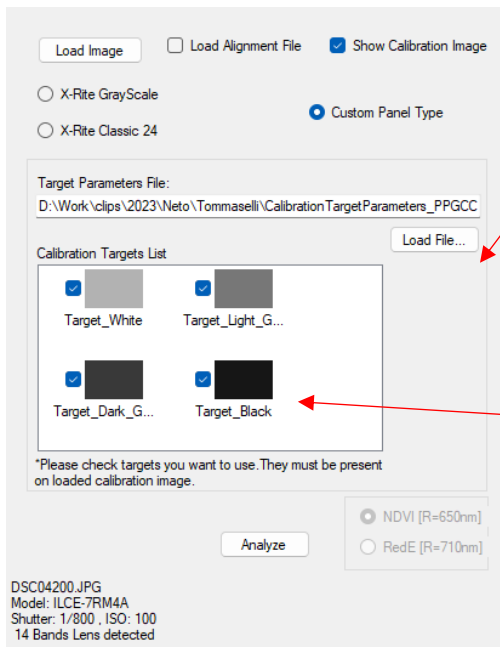
Load custom target parameters file. You can find example file inside "Docs" folder.

Select targets from file target list which also are present in loaded image.

If after clicking "Analyze" targets are not detected, please mark them with right mouse click menu.After that please click "Analyze" again.
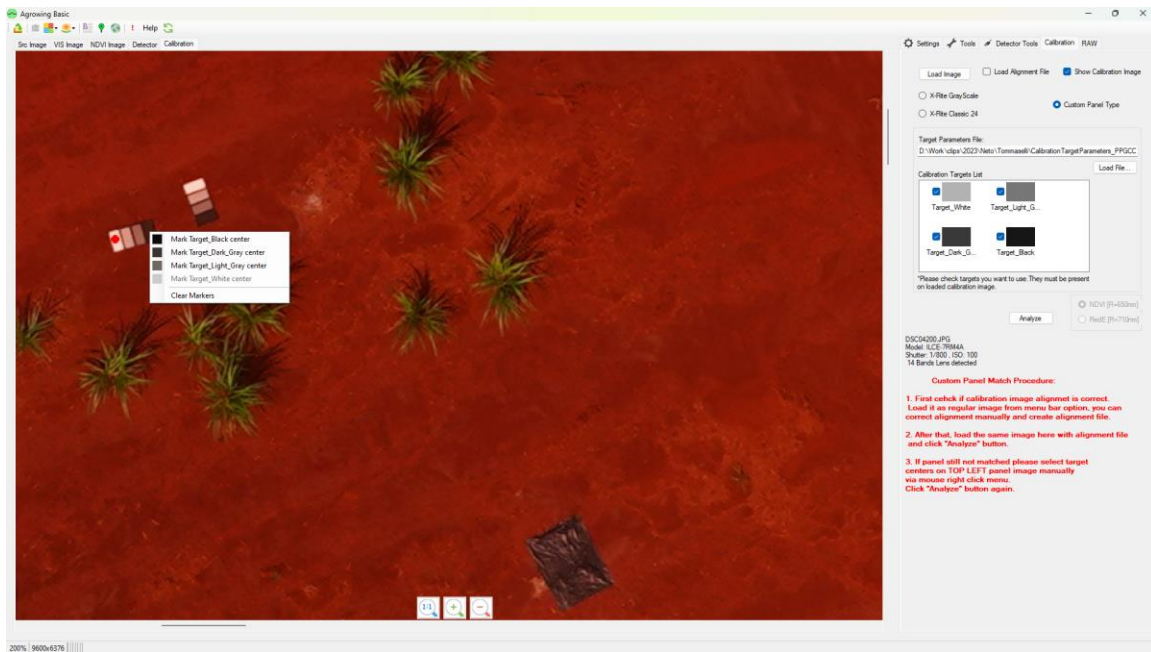
The Batch Runner

The batch runner prepares the acquired GPS tagged imagery for processing using standard orthophoto and mosaic stitching tools. The application allows manipulating and analyzing directories through a simple and intuitive GUI. Selecting the desired output files is done by checking the right boxes. You can start the Batch Runner by pressing the "B" button on the main menu on the top of the Agrowing Basic app.
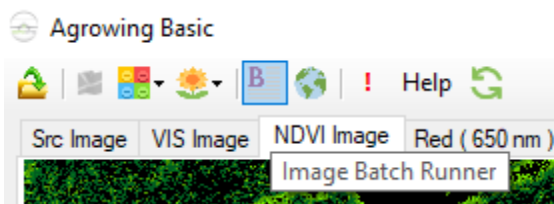
You can choose a variety of different output combinations for your imagery.

Down sample images, save in different file formats and combinations including Multipage TIFF files, and correct the visual image colors.

Align modes:

Align every image: - Every image is alignment independently. Slow process

Align only first image: - Application chooses arbitrary image and alignment result of this image applied to all the rest images. Fast process but can be less accurate in some images from the same set, because of small altitude and shooting angle differences.

Align ground images: - Images which were taken from the ground, from a close distance ~1m-1.5m to the object.

Align by image point (Align by loaded Image (A7)): - The alignment start point is chosen from previously loaded image in Agrowing Basic application. Rather fast and accurate process, all the images should be from the same lens and altitude.

Scan folder recursively

Click to select all bands

Recommended for fast process

Save Multipage TIFF images

Select for Pix4D mosaic software

Add different band combinations for output

Each combination will be saved in separate folder

Agrowing Batch Runner — □ ✕

Scan folder recursively

Source folder: [   ]   Open Folder ...

☐ Scan recursive

Batch Settings

| APS-C - 4 bands | FullFrame - 12 bands |

⊟ ☐ Save Image Parts
　　☐ Save VIS image Color Adjusted
　　☐ Save VIS image
　　☐ Save NIR image
　　☐ Save Blue+Green+NIR combination
　　☐ Save Red+Green+NIR combination
　　☐ Save Red+Blue+NIR combination
⊟ ☐ Save Color Bands
　　☐ Save 450 nm image
　　☐ Save 550 nm image
　　☐ Save 650/710 nm image
　　☐ Save 850 nm image
　　☐ Save Bands As Multi-Page TIFF
　　☐ Save 4 Bands As One-Page TIFF
⊞ ☐ Save Vegetation Indexes

Save Multipage TIFF images

Common Settings

☑ Process images   ☐ Process video [1] fps

○ Align aerial images   ⦿ Align aeial by image point
○ Align aerial by first image   X   Y
○ Align ground images   [10]   [10]

Recommended for fast process

☑ Save in separate folders   Downsample images
Max PC load: [6 ⌄] cpu   ☐ 2x2   ☐ 4x4

Save each combination in separate folder

☐ Apply Radiometric Calibration (Experimental)

☐ Correct Relative Illumination

VI & Color Settings
Advanced Settings
RAW Options

*Note: GPS data from original image will be saved

[Start   ]   [Cancel   ]
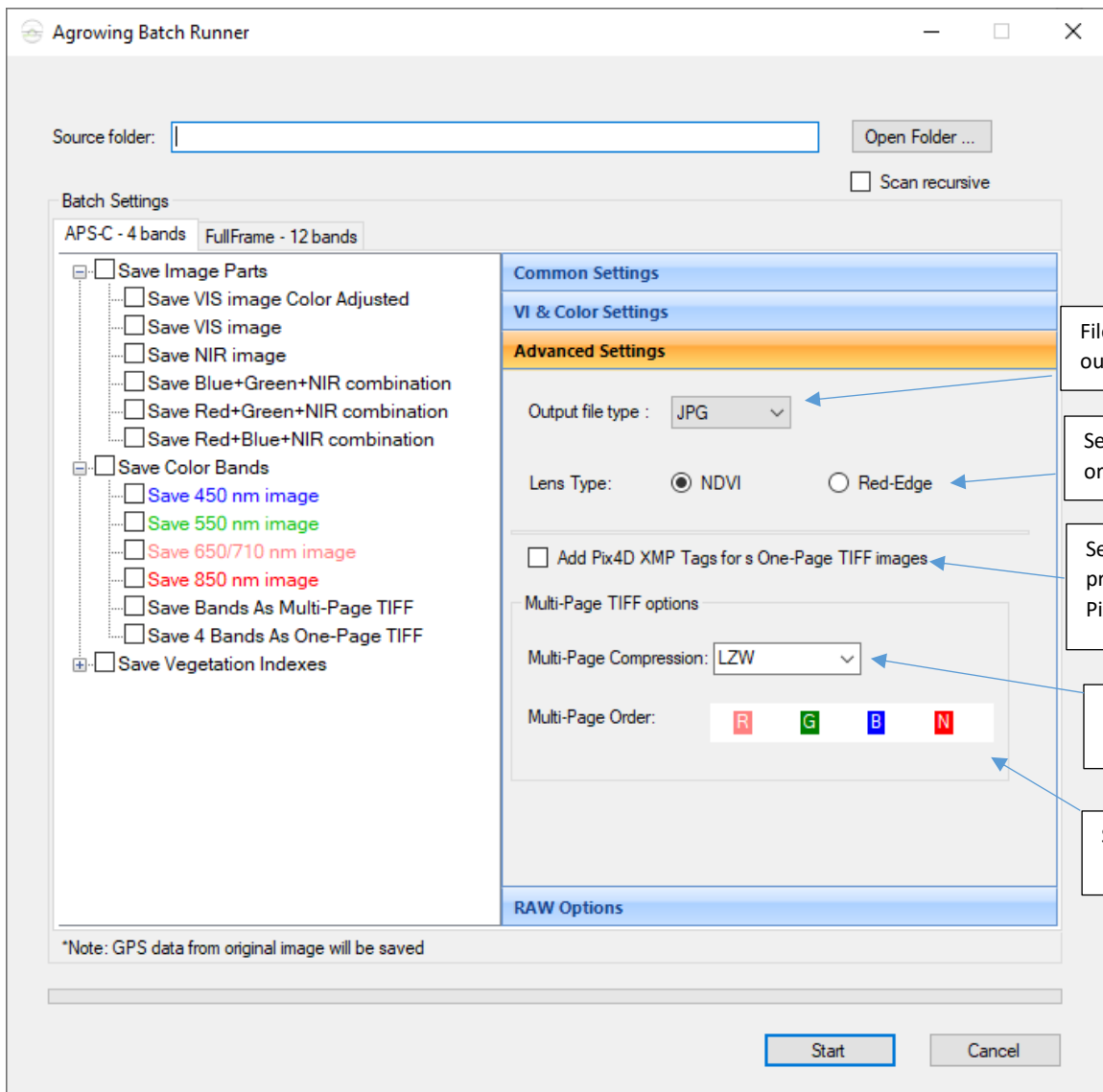
Note*: When you save the VI index images you **can not** use them for building mosaic.
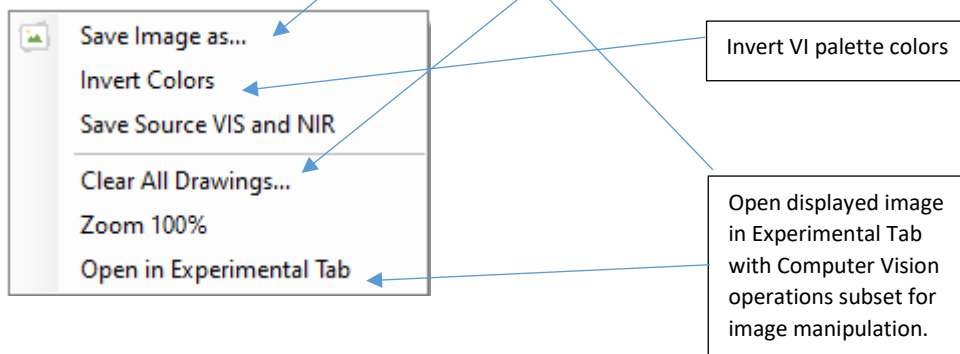
Agrowing Batch Runner

Source folder: [   ] Open Folder ...

☐ Scan recursive

Batch Settings

APS-C - 4 bands | FullFrame - 12 bands

☐ Save Image Parts
  ☐ Save VIS image Color Adjusted
  ☐ Save VIS image
  ☐ Save NIR image
  ☐ Save Blue+Green+NIR combination
  ☐ Save Red+Green+NIR combination
  ☐ Save Red+Blue+NIR combination
☐ Save Color Bands
  ☐ Save 450 nm image
  ☐ Save 550 nm image
  ☐ Save 650/710 nm image
  ☐ Save 850 nm image
  ☐ Save Bands As Multi-Page TIFF
  ☐ Save 4 Bands As One-Page TIFF
☐ Save Vegetation Indexes

Common Settings

VI & Color Settings

Advanced Settings

Output file type :   JPG ▾

Lens Type: ◉ NDVI   ○ Red-Edge

☐ Add Pix4D XMP Tags for s One-Page TIFF images

Multi-Page TIFF options

Multi-Page Compression: LZW ▾

Multi-Page Order: R G B N

RAW Options

*Note: GPS data from original image will be saved

File type for saving output images

Select lens type NDVI or Red-Edge

Select in case you will process output with Pix4D

Choose TIFF compression

Select Channel order

Start   Cancel

Choose output TIFF precision for RAW image conversion

Right Click Menu

Image right click menu

Save displayed image

Clear all
measurements
applicable to VI&

VI image right click menu.

Invert VI palette colors

Open displayed image
in Experimental Tab
with Computer Vision
operations subset for
image manipulation.

Experimental Tab with Computer Vision functions

By clicking "Open in Experimental Tab" right click menu, viewed image will be copied to
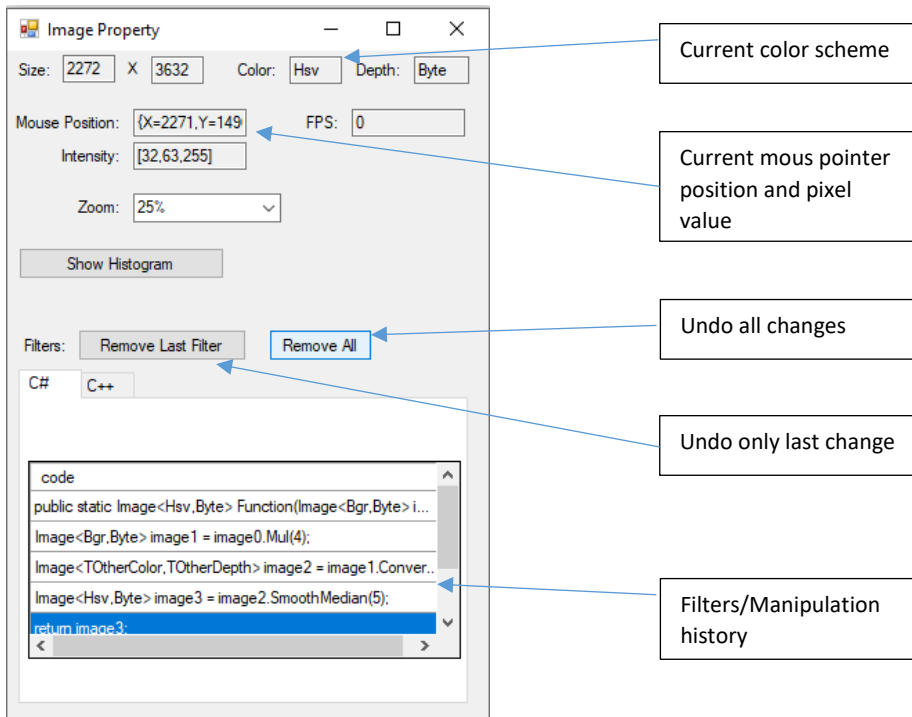"Experimental Tab"

On this tab you can experiment with different image manipulation functions available from
Computer Vision library. It could be very helpful in research, with this set of filters you can
manipulate any image in a certain way to emphasize some hidden features inside the image or
just see those features more clearly.

Please see some OpenCV menu examples and image manipulations below:

By clicking right mouse button on Experimental Tab image OpenCV menu will open.
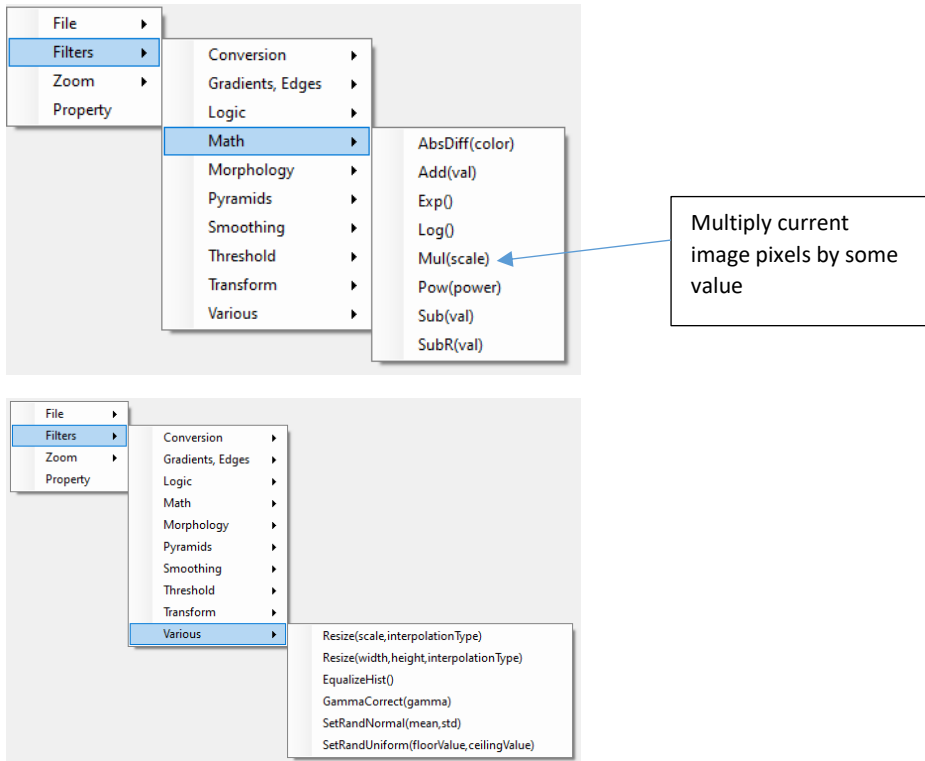
In order to see a pixel values or undo last operator applied please click on "Property" menu item. A dialog will open with some options displayed below.

Current color scheme

Current mous pointer position and pixel value

Undo all changes
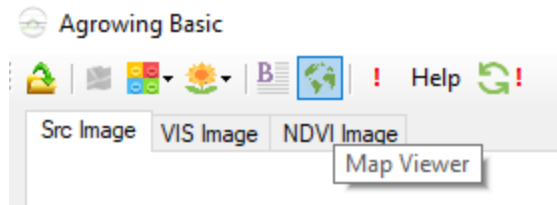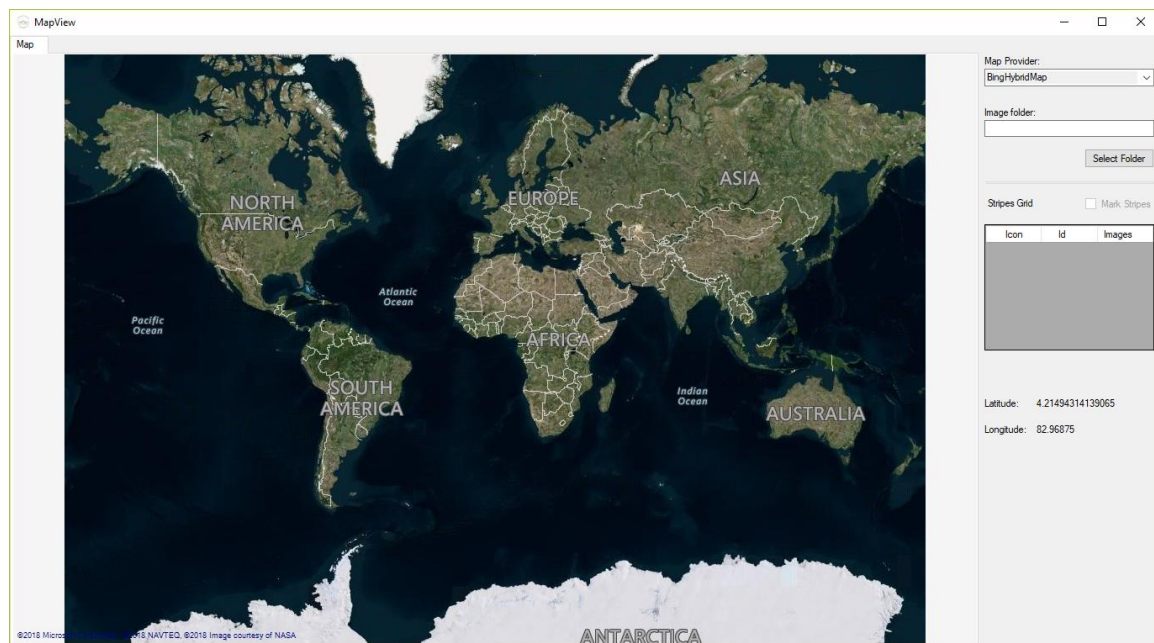
Undo only last change

Filters/Manipulation history

Map Viewer

In Map Viewer you can view the survey image positions on the map, the images must be geotagged.
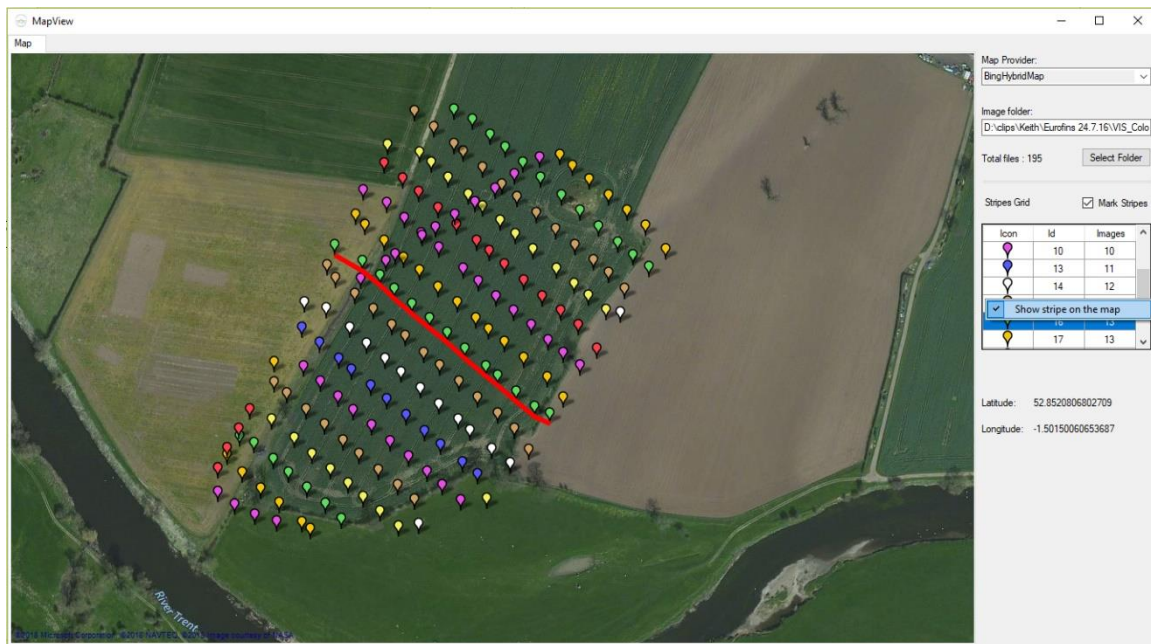
Click on the globe icon on the Agrowing Basic toolbar menu.

In the Map Provider combo box list you can choose the map provider and map type.

After loading the dataset you can click on "Mark Stripes" checkbox to mark the stripes in different colors, also by right clicking on the stripes table you can choose to mark selected stripe on the map.

By right clicking on the image mark you can choose to view the image in a separate window.

By left clicking on the image mark you will see the image GPS coordinates.
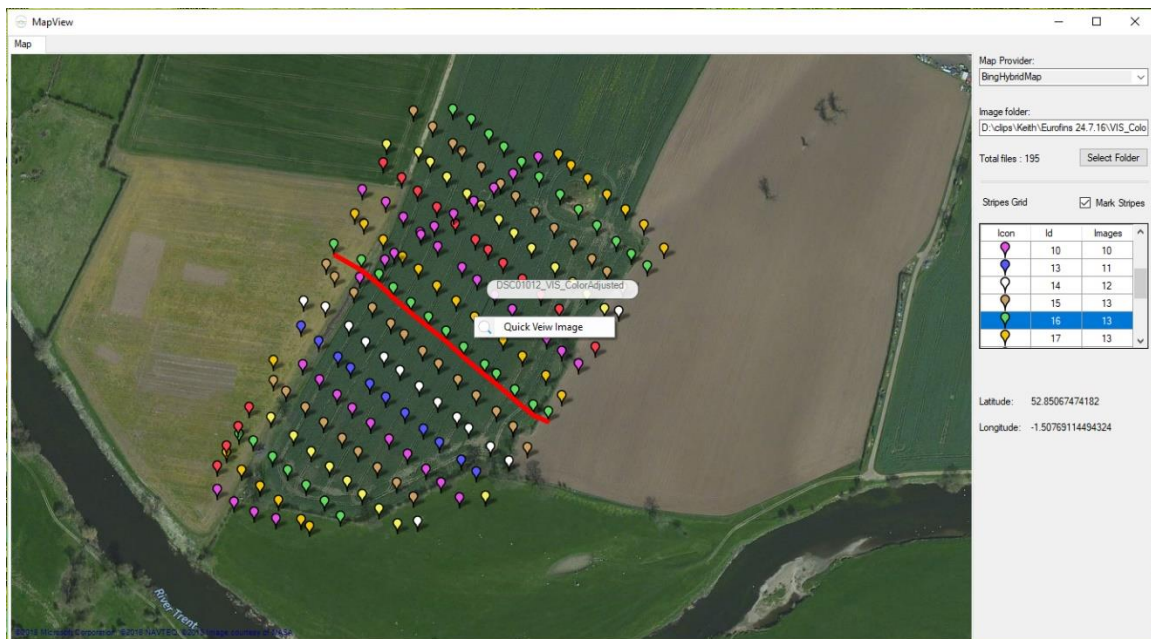
For additional information and/or requests/questions, please write to support@agrowing.net