Icaros OneButton
User Guide

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Prerequisites to Using OneButton

General Information

To get a copy of OneButton, you can either receive a year free trial of the software through purchasing one of our underlined camera systems, or you can refer to this unique link. Once you have your copy of the software, refer to the OneButton QuickStart Guide provided by Icaros to install it. To meet the processing requirements for OneButton, refer to the Tetracam PixelWrench2 User Guide provided at the PixelWrench2 page on the Tetracam website.

In addition, please refer to the Tetracam Icaros OneButton Errata Sheet, so that you are able to stay updated regarding new releases of OneButton as it relates to working with Tetracam imagery. This is provided at the Icaros OneButton page on the Tetracam website; this user guide is also provided there.

Finally, the Table of Contents has hyperlinks to all of the sections of this guide, and there is a hyperlink at the top right of the header of this document back to the Table of Contents.

System Requirements

The system requirements of OneButton are the following:

Minimum: Intel Core 2 Duo; 4 GB RAM; Nvidia GeForce GT 4XX or ATI Radeon HD 5430; Windows 7, Windows 8.1, Windows 10, all 64 bit, and either the Pro or Ultimate editions.

Systems that are comparable to the above will be sufficient; less capable systems may be usable, but those haven't been tested. Also, OneButton runs well in a configuration that has either a very fast processor and an integrated video card, or a decently fast processor and a dedicated video card. The best configurations have a very fast processor, powerful dedicated video card, and at least 8 GB of RAM. Home editions of Windows are not currently supported.

OneButton Processing Requirements

In order to use OneButton to create orthomosaics, it is required that the user have access to the following:

- If using an ADC series system (which includes ADC LCD, ADC Lite, ADC Micro, or ADC Snap), color processed NIR/R/G TIF image files.

- If using an MCA series system (which includes Micro-MCA4, Micro-MCA4 Snap, Micro-MCA6, Micro-MCA6 Snap, Micro-MCA12, Micro-MCA12 Snap, or RGB+3), either multi-page TIF image files or RGB extractions in the TIF image format.

- Associated with an image set, GPS information in image metadata or GPS log file created from GPS Log Distiller.

It is noteworthy to consider that JPG may be used as an image format for everything but multi-page TIF of the MCA series systems; however, JPG is a compressed image format, which means that file size is reduced with the expense of reduced image quality.

In addition, it is recommended that all pictures be taken with at least 60% overlap between images in the same flight line and at least 40% overlap between flight lines; in other words, at least 60% overlap and at least 40% sidelap.

Processing with OneButton

Tetracam Workflow

What follows is a general Tetracam workflow for both ADC and MCA series systems. Project 1 of Appendix B was used to make these instructions; feel free to follow along using that project or using your own project. Either way, to get started, Tetracam recommends that you have a folder that is structured in the following way:

1. Create a new folder and name it based on how you would describe your project, or name it according to the project date. For example, "Paul's_First_Project" or "16-6-7_Project" would both be good choices.

2. Create a new folder inside of this project folder you created in Step 1, and name it "Data". Inside this folder, copy the following into it: your TIF image files and, if you have one, your GPS file.

3. Create a new folder inside of the folder you created in Step 1 and name it "Output".

4. At this point, you should have a folder with a specific name for your particular project, a folder that contains your images and logs called "Data" inside of that project folder, and an empty folder called "Output" inside of that project folder.
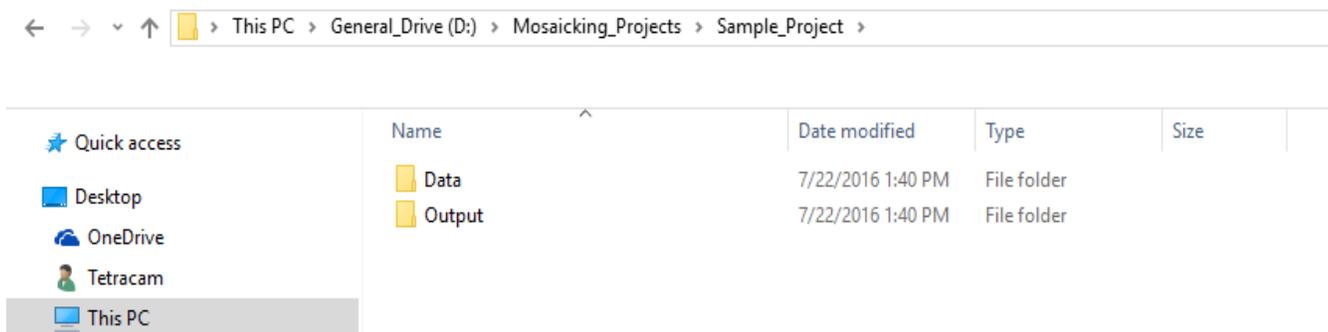
Now that you have done this, refer to the following procedure:

1. Open OneButton.

2. Click New at the top left of the screen.
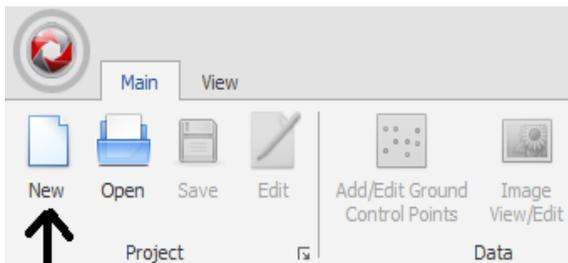
3. Under "1. Project File:" there is a "..." to the right of the text box. Click this "..." button.

4. Navigate to the folder you created earlier called "Output". The default name for the project file is "NewProject". You can leave it as is, or you can name it to something else. Either way, once you are satisfied, click the *Save* button.

5. Under "3. Data Source:", click the radio button that says "Image metadata" or "GPS file", depending on what you have.

6. Under "4. Image Folder:", click the "..." button to the right of the text box.

7. Navigate to your "Data" folder. Once you have done so, click the *Select Folder* button.

8. A notification will mention it is gathering information. Once it is done, you'll notice that some fields have been filled in. If you have chosen "Image metadata" as your data source, the boxes referring to "6. Output projection", "Min height (m), and "Max height (m)" should be filled in; otherwise, they will be empty. Other fields in the "Create New Project" window have also been filled in; we'll address those in later steps.
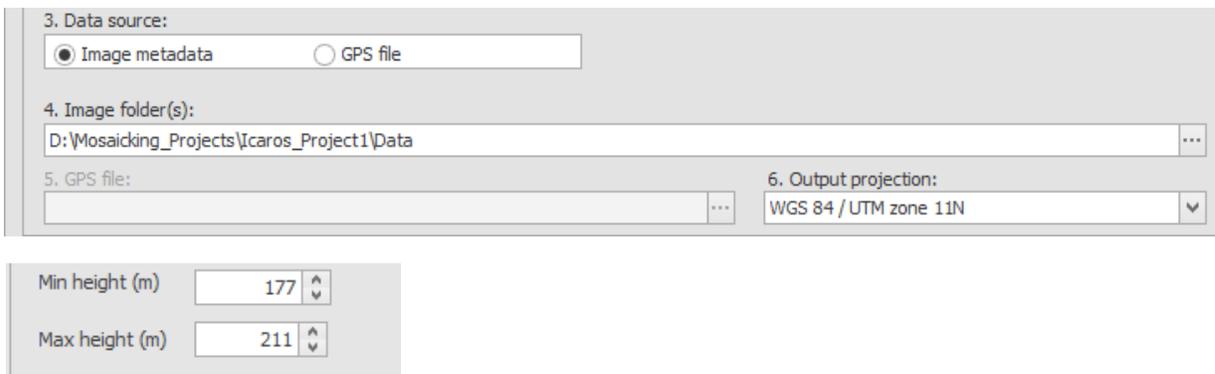
9. If you have chosen "Image metadata" as your data source, skip to Step 16; if you have chosen "GPS file" as your data source, proceed to the next step.

10. Under "5. GPS File:", click the "..." button to the right of the text box.

11. Navigate to your "Data" folder; your GPS file should be in there. Click on it, and click the *Open* button.
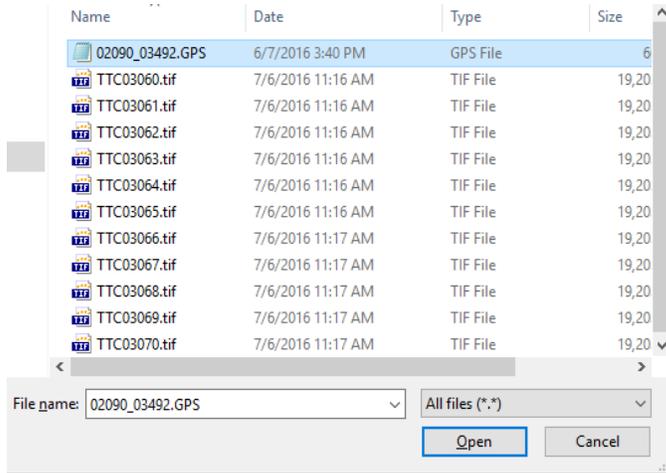
12. A window titled GPS Data Import will appear. Check to see if everything makes sense in the window. If it doesn't, right click on one of the columns to switch them to something else. For example, to replace longitude with latitude, you'd right click on the X/Lon column, then move your cursor over to "Assign column as", then you would choose Y/Lat in the menu that pops up. You'd do the same thing for Y/Lat to X/Lon. Once you are satisfied with the way the columns are situated, click the *Next* button.

13. The next window will look similar to the previous one; however, notice that Latitude and Longitude columns have been added. In this window, it's important to note that a coordinate system has been automatically detected at the bottom left of the window. If it has not, you'll want to rearrange the columns according to the instructions in Step 11, or your images have GPS coordinates that can't be automatically identified as it relates to coordinate systems. If it is the latter, you may want to check into the coordinate system of the particular region that you took your pictures in. Once you have a coordinate system identified, click the *Convert* button.
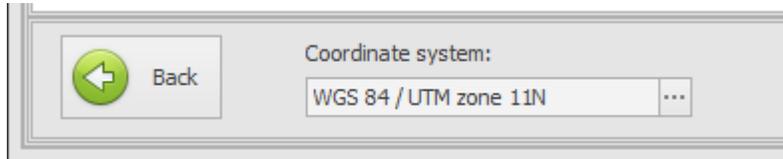
14. The window has changed again. If something seems amiss, click the *Back* button; otherwise, click the *Finish* button.

15. A message will appear telling you to wait and that the minimum and maximum height are being calculated. If the process is successful, the min height and max height fields underneath "Application/sensor settings" will have been automatically populated. If they haven't been populated, it is recommended that you repeat steps 10 through 13, considering that it is likely there is a mistake there that is causing the fields not to be populated.
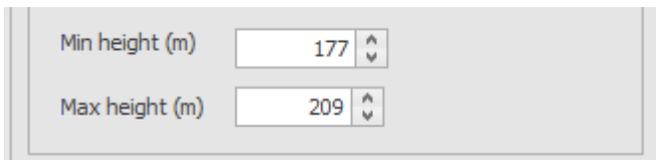
16. Under "Application/sensor settings", the drop down menu to the right of "Project Type" should be "Agriculture". In addition, change the terrain type and surface type to that which matches your data set according to your understanding.

17. If you are working with an ADC series camera or you are using RGB extraction image files from your MCA series camera, the drop down menu to the right of Sensor spectrum should read "Standard"; if you are working with an MCA series camera and you are using multi-page TIF image files, the drop down menu should read "Multi-spectral". If you have chosen "Multi-spectral", the drop down menu to the right of "Multispectral type" should read "MultiPage"; also, the number underneath "Master page/channel" should read 0 (assuming your master camera is the first camera in the array, which is generally the case).
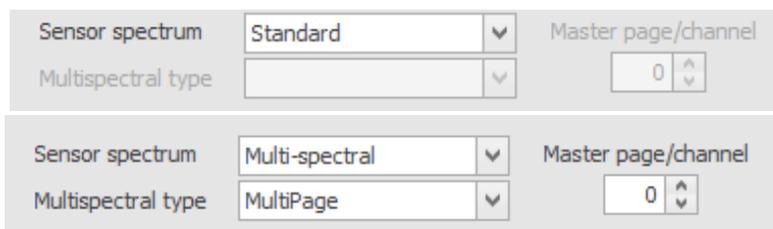
18. In the second box under "Application/sensor settings" that contains things like "Image size (pixels):" and so forth, you'll want to verify that the values in those fields are in fact correct by referring to Appendix A. Please be sure "Image size (pixels)", "Sensor pixel size (mm)", and "Lens focal length (mm)" are all correct considering your specific camera system. Also, be sure to check the box next to "Auto lens model".

	width	height	
Image size (pixels):	1280	1024	
Sensor pixel size (mm):	0.0052		
Lens focal length (mm):	9.6		✓ Auto lens model

19. The last thing you have to do in the "Create New Project" window is check the image overlap percentage values on the bottom left of the window. Change the values to reflect the values you used in your data set; if you are unsure what values you used in your data set, just leave them as they are.

	forward	side
Image overlap (%)	60	40

20. Look everything over one last time, and then click the *OK* button.

21. A message will appear telling you that OneButton is identifying camera orientation. Once it is finished, a new window will appear titled OneButton Processing Output. In this window, make sure GeoTiff Image Map is highlighted on the top left, then click the *Run Project* button at the bottom right.

22. Once the process is completed, a window will notify you of this. Also, a processing report will display for your information. Close the processing report once you are done looking at it.

23. In the main OneButton window, click the "Output Folder(s)" button at the top middle of the screen. Once you have done this, a folder will open, and the TIF image file that OneButton created is called "AutoTile_1.tif". Open this file, and there you will see your orthomosaic created by OneButton!
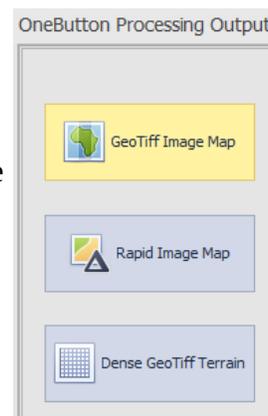
Post-Processing with PixelWrench2

PixelWrench2 and OneButton are compatible with one another in such a way that not only can PixelWrench2 do pre-processing for OneButton, but it can also do post-processing for it. Feel free to experiment with PixelWrench2 regarding working with your orthomosaic and see what kind of useful information you can gather.

Open a OneButton Orthomosaic in PixelWrench2

1. Open PixelWrench2.

2. Click the File menu at the top of the screen, and click Open.

3. Navigate to the "Output" folder that you created your project file in. *For your reference, the relative path to this for any orthomosaic you make is this, once you go inside your project folder: "StitchMe\WorkDir\output".* To get there manually, let's say you had named your project file "Sample"; based on that, you would have "Sample.smp", and a folder called "Sample". Open the folder called "Sample". Then, open "StitchMe", open "WorkDir", then open the folder called "output". Now, click on "AutoTile_1.tif", and click the *Open* button.
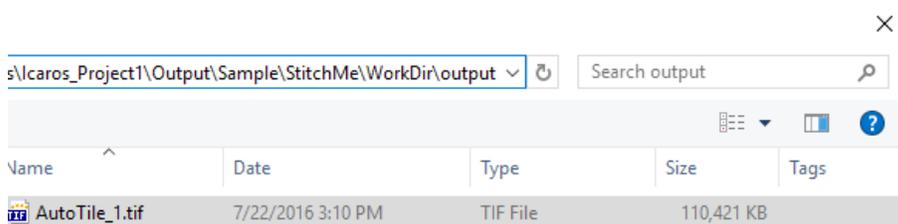
4. At this point, you should see the orthomosaic opened in PixelWrench2.

Output a OneButton Orthomosaic NDVI

1. Open PixelWrench2.

2. Open your orthomosaic by using the process explained here.

3. Click the View menu, then click *Index Tools*.

4. If you have a color processed TIF orthomosaic or RGB extraction orthomosaic, proceed to the next step; if you have a multi-page TIF orthomosaic, you must first output an RGB extraction image before you can create an NDVI. Proceed by clicking the MCA tab in the Index Tools form, select the bands you wish to export, then click "MultiFrame TIF > RGB".

5. Now, click on the Index tab. There is a drop down menu very close to the top of the window. Click on that, and choose NDVI from the selection. Make sure that your color processed TIF orthomosaic or RGB extraction orthomosaic is the active window, then click the *Execute* button.

6. You should see an NDVI of your orthomosaic in a new window!
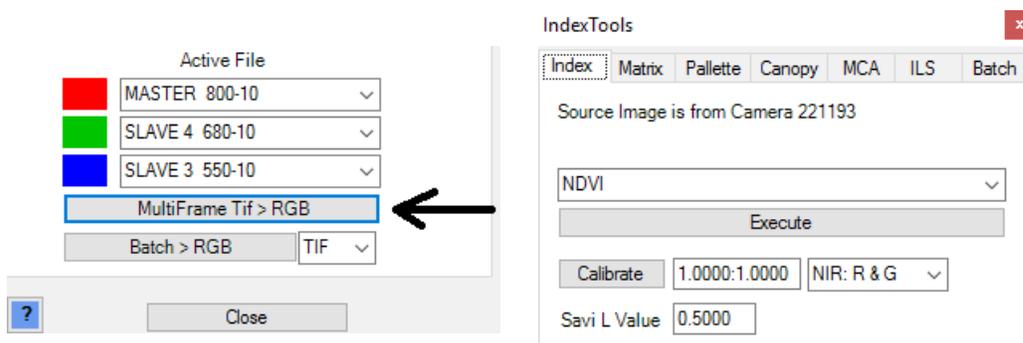
Appendix A – Table of Camera System Specifications

Type of Camera System	Image size (pixels)	Sensor pixel size (mm)	Lens focal length (mm)
ADC	2048x1536	0.0032	8.0
ADC Micro	2048x1536	0.0032	8.43
ADC Snap	1280x1024	0.0048	8.43
Micro-MCA	1280x1024	0.0052	9.6
Micro-MCA Snap	1280x1024	0.0048	9.6
RGB+3	1280x1024	0.0048	9.6

Appendix B – OneButton Projects

General Information

Below this consists of tips to build the projects associated with this user guide.

Project 1

- Make sure the output projection matches "WGS 84 / UTM Zone 11N"
- Set the template name to "Agriculture" and the terrain type to "Flat".
- Set your surface type to "Vegetation", and the drop down to "Medium vegetation".

- Set the sensor spectrum to "Multi-spectral", the multispectral type to "MultiPage", and the Master page/channel to 0.
- This is a Micro-MCA image set, so adjust the image size, sensor pixel size, and lens focal length according to Appendix A.

Project 2

- This project is the same as the first, except it is using RGB extractions of multi-page TIFs, so everything applies, except you'll want to change the sensor spectrum to "Standard".

Project 3

- In the area where you select the coordinate system in the GPS Data Import window, click the "...". In the window that appears, type Israel in the text box. There will be three selections that appear. Choose "Israel / Israel TM Grid".
- Set the template name to "Agriculture", and set the terrain type to "Flat".
- Set the surface type to "Vegetation" and the drop down menu to "High vegetation".
- This is an ADC Micro image set, so adjust the image size, sensor pixel size, and lens focal length according to Appendix A.

Conclusion

If you have comments or if there is anything that has been stated in an unclear way, feel free to email support@tetracam.com. In addition, we would appreciate it if you would take a look at the Tetracam website, so that you can get news and information about our products.

Also, feel free to visit the Icaros website to learn more about their products and what they have to offer.

Thank you for reading this guide.