CollatriX v2 Manual

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To start: download files

- Download CollatriX v2
  - https://github.com/MMI-CODEX/CollatriX/releases
  - To download just click on the file you want under “Assets”
    - If you have a windows download the .exe version
    - If you have a mac download the .dmg version
      - This version is compatible with either Intel or M1/M2 chips
      - You’ll also need exiftool installed on your mac. If you already have it installed, great! If not, download the zipfile on github for an easy download (more details on this slide).
    - If you get a security warning…
      - Windows: click on open anyway
      - Mac: go to settings > privacy & security > allow the app to open anyway

- We strongly encourage following along with our video tutorials
  - https://media.oregonstate.edu/playlist/dedicated/1_hm9cgwh4/

Launching CollatriX

- Launch CollatriX by opening the application (once opened it will look like Fig 1).
  - To launch, just double click on the file you downloaded
- Note, that the program may take longer to launch its first time opening. To open, just double click on the file.

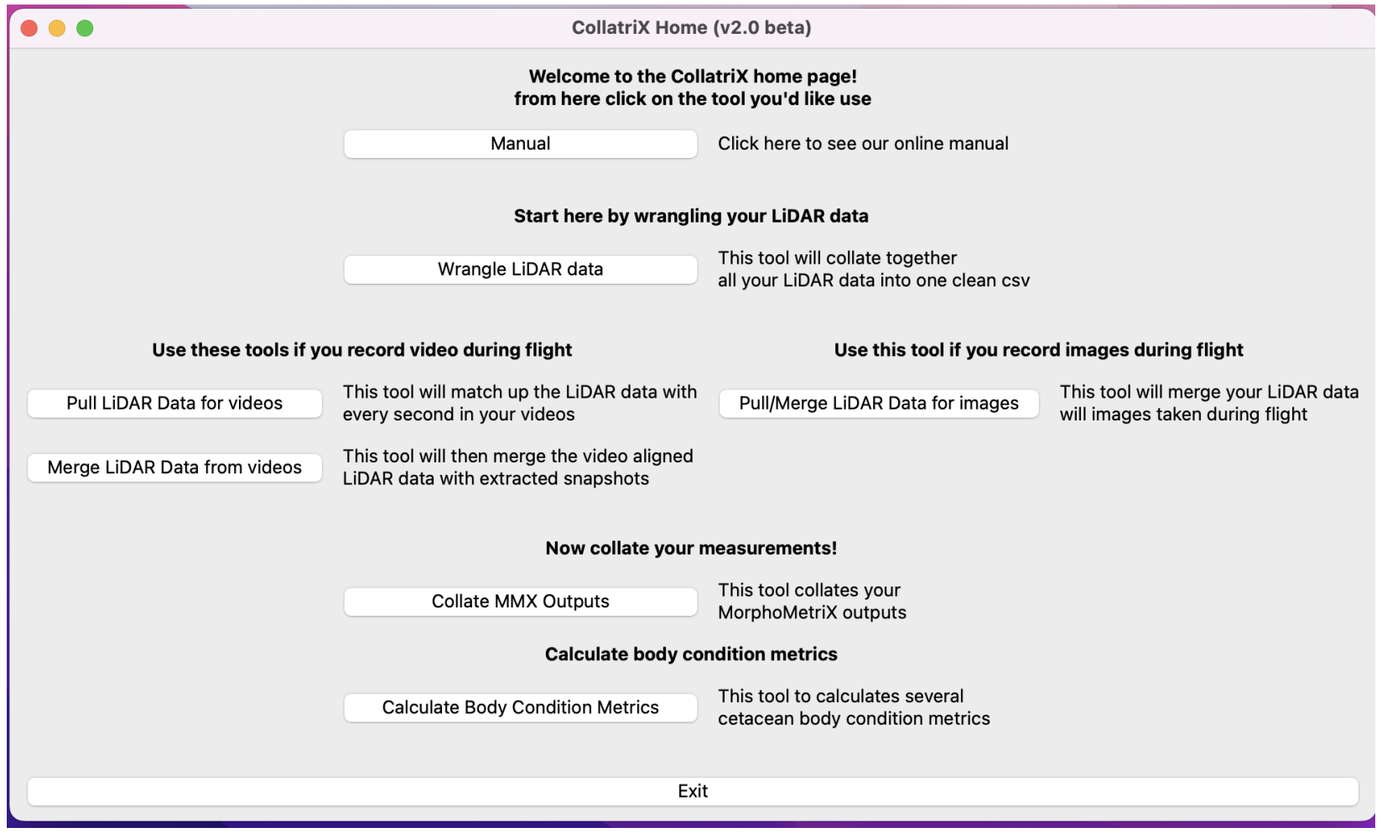


Figure 1. Opening CollatriX

Function overview

Key

Blue fill = **new** collatrix function

Yellow fill = existed in old collatrix

- CollatriX now has all functions available from a homepage (Fig 1).
- To run one of the tools, just click on the button

This function will combine all your lidar files (csvs or gpxs) into one clean file to use in the next steps

These functions will matchup LiDAR timestamps with snapshot timestamps extracted from videos

This function will matchup LiDAR timestamps with timestamps from images taken during flight

This function calculates several common cetacean body condition metrics

This function collates outputs from MorphoMetriX v2

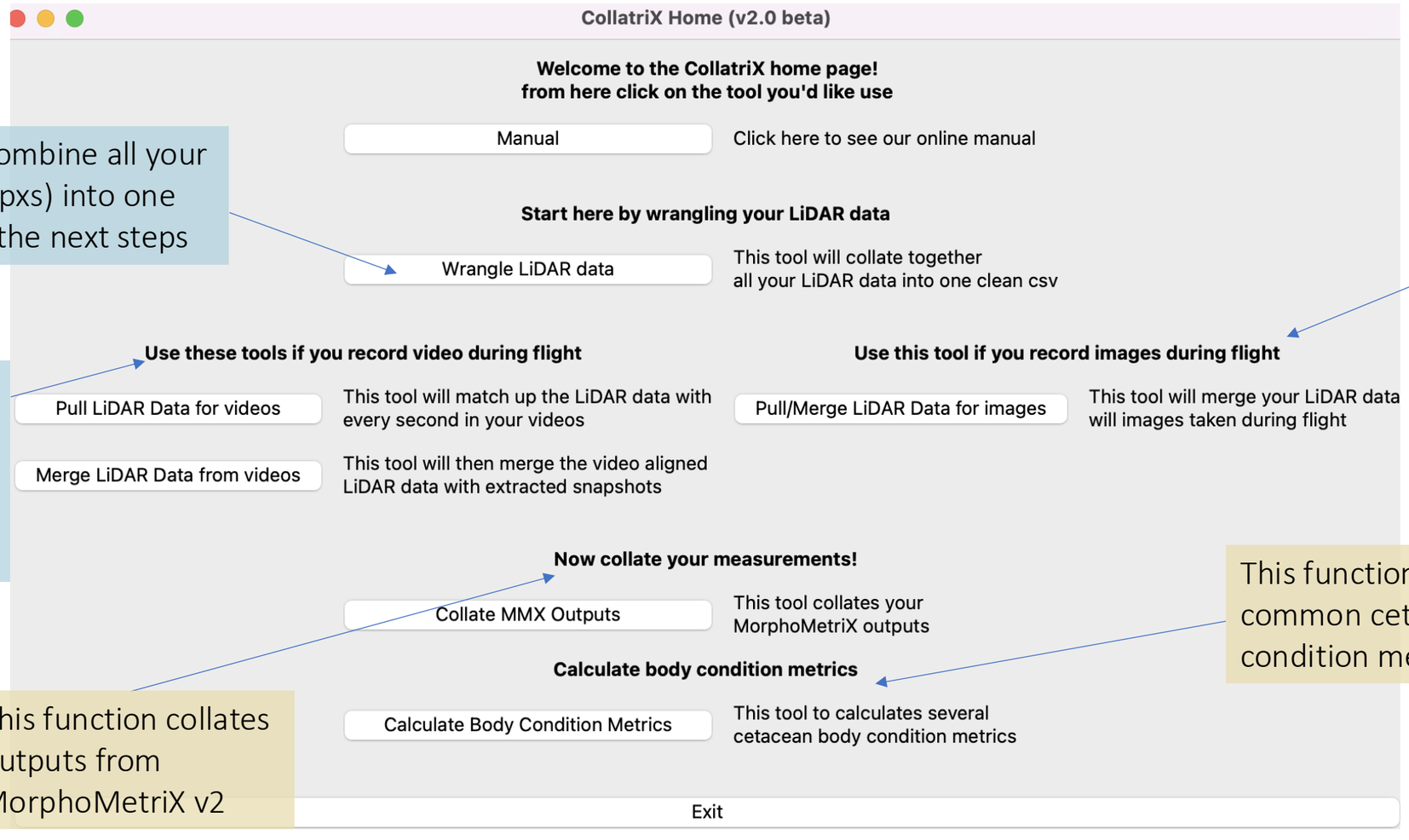


Figure 1. CollatriX home page

the output of the Merge LiDAR functions can be the start of your safety for the Collate function

Wrangle LiDAR Data

- LiDAR data can come in different forms, so this tool collates all your lidar files into one clean output that will be used as an input for the subsequent lidar tools (both the video and image associated functions).
- This function can wrangle with csvs from a LightWare LiDAR (e.g. LidarBoX) or gpxs from a drone like the lemhex.

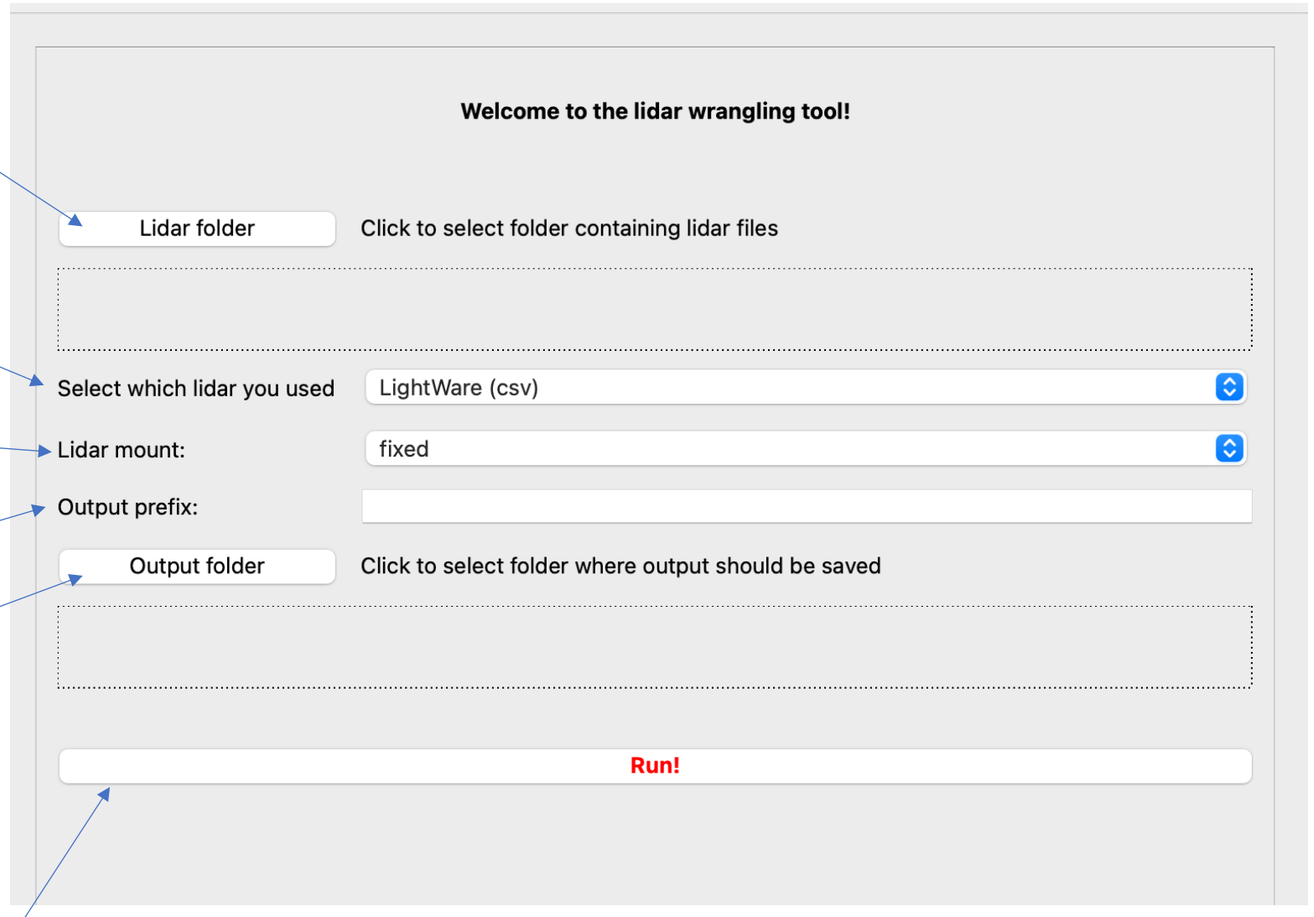
Click this button and navigate to the folder where all your lidar files are saved. The file path you select will be displayed in the box below.

Select your lidar type from the drop down, your choices are LightWare (csv) and Lemhex (gpx)

Select whether your lidar is mounted to the drone (fixed) or if it's gimbaled. If gimbaled, the tilt degree correction will *not be* applied

Type the file prefix you'd like in this text box. The output file will be named: "*prefix*_CleanedLidar.csv"

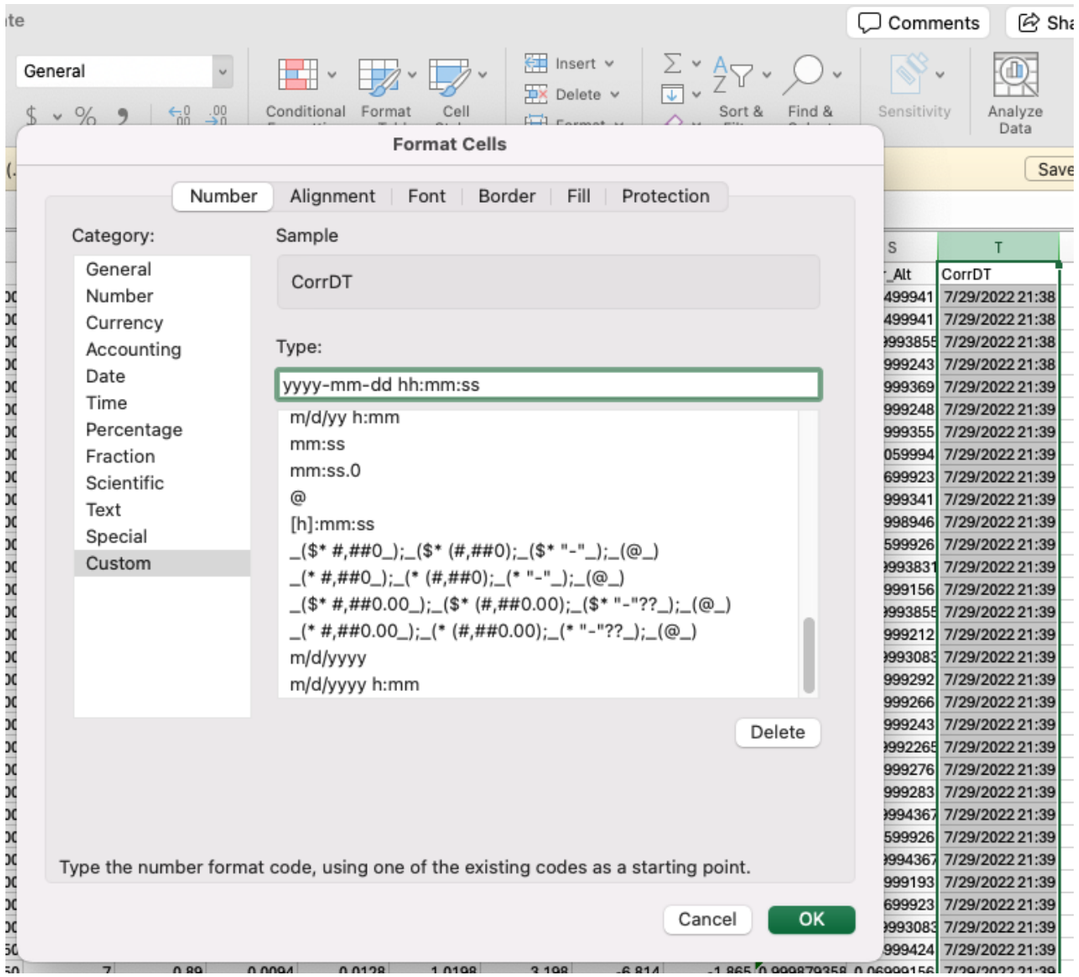
Click this button and navigate to the folder where you want the output file to be saved. The file path you select will be displayed in the box below.



Click this button to run the tool. A message will display below the button when it's done running.

Wrangle LiDAR Data – beware excel date formatting

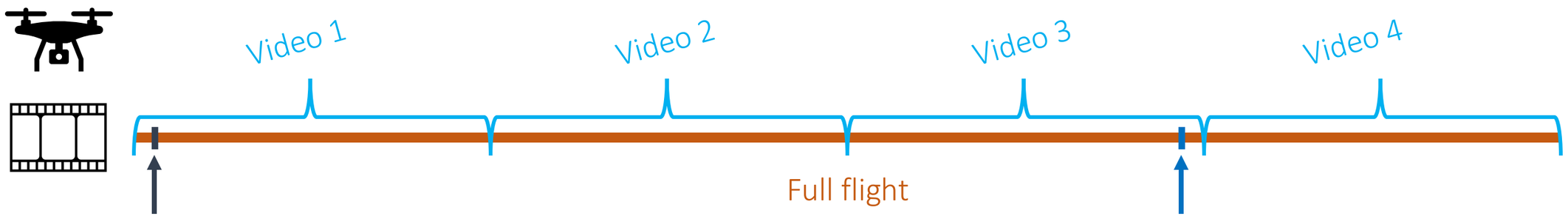
- If you open the output csv in excel, the CorrDT formatting may change from YYYY-MM-DD HH:MM:SS (ex. 2024-02-06 11:40:00) to M/DD/YY H:MM (ex. 2/06/24 11:40) IF you save this sheet in excel, the date formatting will be messed up and the next tools will throw an error.
- If you do save it, just highlight the column and change the format to custom and enter the following:
  - yyyy-mm-dd hh:mm:ss



LiDAR for videos

- If you record video during flight and then extract snapshots for measuring, these tools are for you. Because the LiDAR is using time from a satellite and the snapshot time is associated with the time in the video, a few steps are needed to align timestamps.
- The first tool (Pull LiDAR function) matches up the LiDAR timestamps with the video timestamps. This tool will output a datasheet where every second of every video is matched up with its corresponding LiDAR timestamp and value.
- The second tool (Merge LiDAR function) will then merge the snapshot timestamps with the values from the output of the first tool.
- Note: for any of these tools to work, you need to have recorded a GPS satellite time at the start of each flight.

During a flight of continuous recording, the footage is typically split into several videos



*The GPS time image is taken at the beginning of the **flight**, but offset is applied to all **videos** from the flight*

So, for a snapshot from minute 3:40 of video 3, the true image time is: the start time of video 3 (extracted from the video metadata) + 3:40 (time in video) + the offset correction (same for whole flight)

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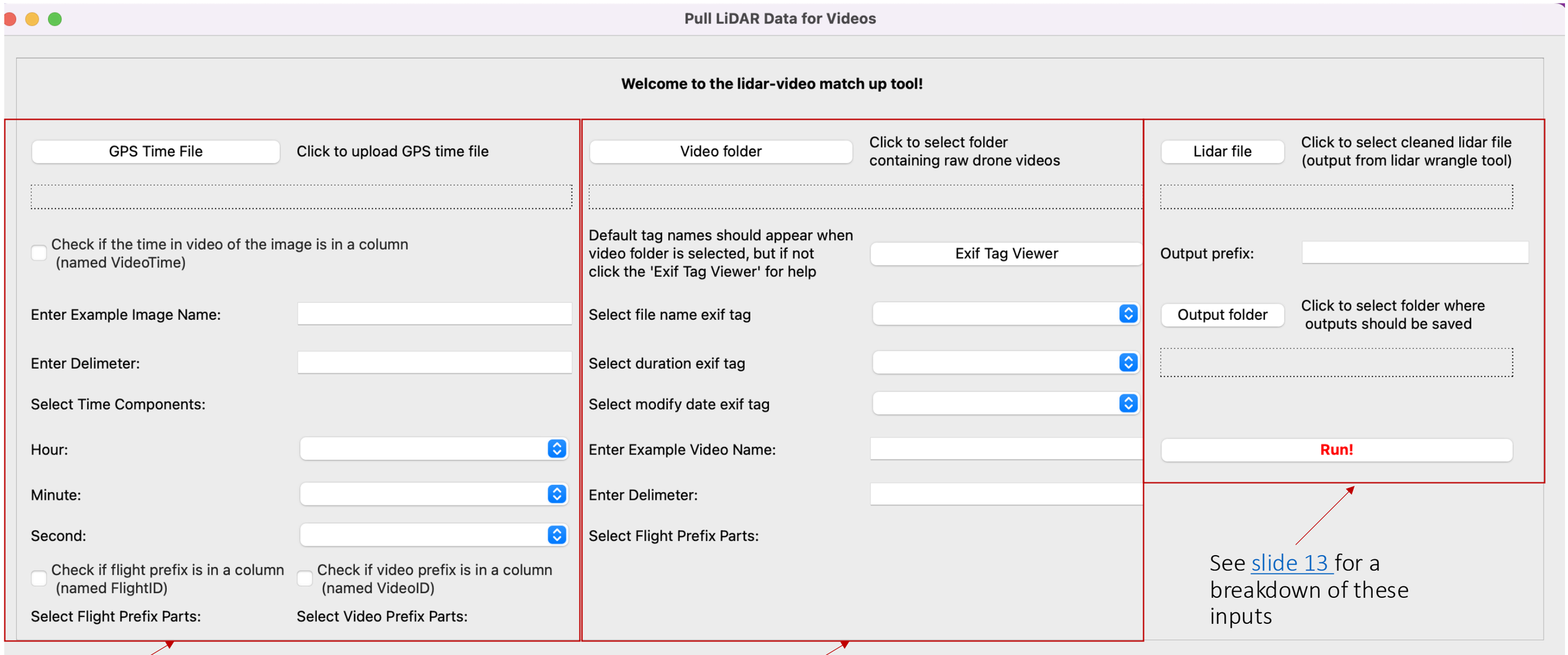
Pull LiDAR Data for Videos

- This tool requires a lot of inputs. We'll walk through them in the next several slides but this is what the complete window looks like when you open it (Fig 3).
- What you'll need: A GPS time file, all your videos in one folder, and the Lidar file from the Wrangle Lidar tool.



See next slide (p. 9) for a breakdown of these inputs

See slide 12 for a breakdown of these inputs

See slide 13 for a breakdown of these inputs

Figure 3.

Pull LiDAR Data for Videos: GPS Time inputs part 1

- Camera clocks on drones are often inaccurate and/or have a lot of drift. So, to make sure that we can properly align our snapshot timestamps with the LiDAR timestamps (come from GPS satellite unit), we follow these steps:
  - We film a GPS clock at the start of the flight
  - We then extract snapshots of the GPS clock using VLC
    - VLC lets us embed the timestamp of the snapshot (time in video) in our image name. But you can have a column with this timestamp if need be.
  - We manually type the time on the clock in the image into a column in our GPS Time file.
- Let's break down an example GPS Time file
  - Note that your column headers must be **spelled and capitalized exactly as shown here.**
    - The contents of the following columns **must also be formatted as shown here**: VideoTime, GPS_Time, and GPS_Date

Here I have the timestamp embedded in the name (00_00_01), meaning this snapshot was taken in the first second of the video

But this column contains the same information, **formatted HH:MM:SS**.

This column is the time displayed on the clock that was filmed in the snapshot. **Formatted as HH:MM:SS**.

This column is the date displayed on the clock that was filmed in the snapshot **formatted as YYMMDD**.

These columns contain information linking the image to the flight and video it came from. If you have this information contained within the image name (as we do here) these columns are not necessary.

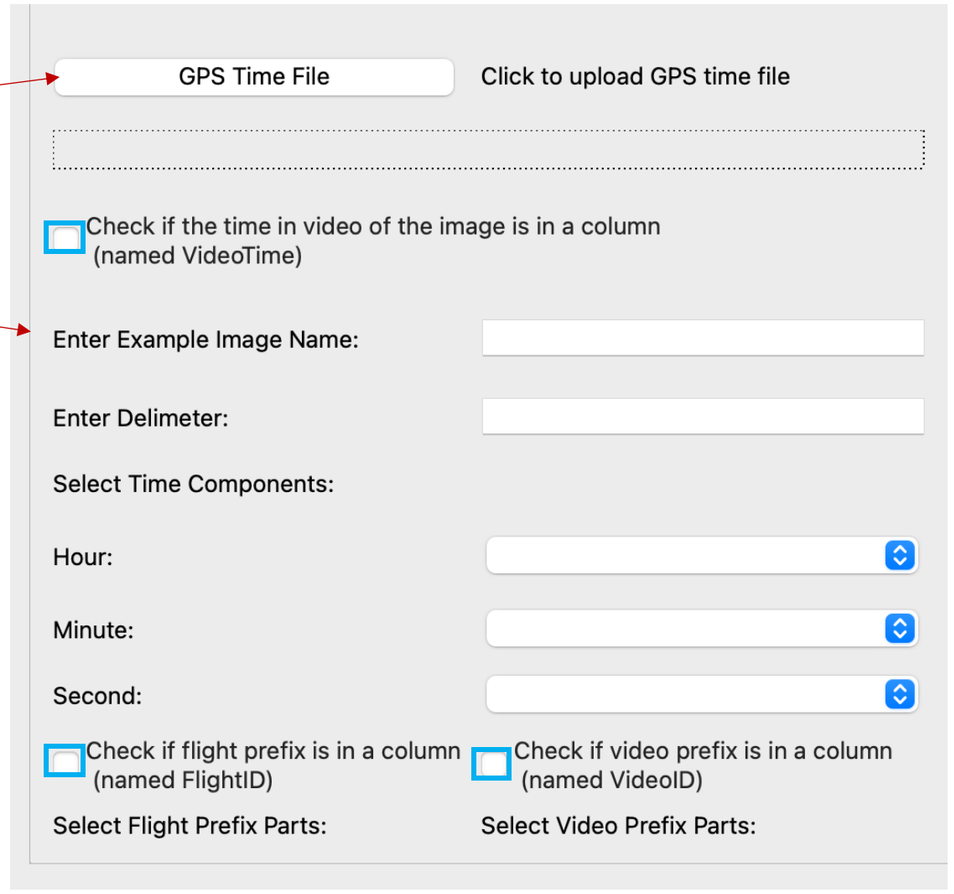
Image name

Image	VideoTime	GPS_Time	GPS_Date	FlightID	VideoID
220729_I2O_S0_U2_DJI0006_00_00_01_vlc00001.png	0:00:01	22:58:12	220729	220729_I2O_S0_U2	220729_I2O_S0_U2_DJI0006
220729_P4P_S0_U2_DJI0007_00_00_02_vlc00001.png	0:00:01	22:37:58	220729	220729_P4P_S0_U2	220729_P4P_S0_U2_DJI0007

Pull LiDAR Data for Videos: GPS Time inputs part 2

Click this button and select the GPS time file you've set up (detailed on previous slide). The file path will appear in the box below the button.

The first image name from the Image column will automatically appear in the "Enter Example Image Name" box



The next steps are all needed if the information from the following columns is included in the image name: **VideoTime, FlightID, VideoID**

If you all three columns, click to check the boxes each column (in blue box here). Then you can proceed to the video input section of this tool.

If you have the information in the image name, don't check the boxes, go to the next slide.

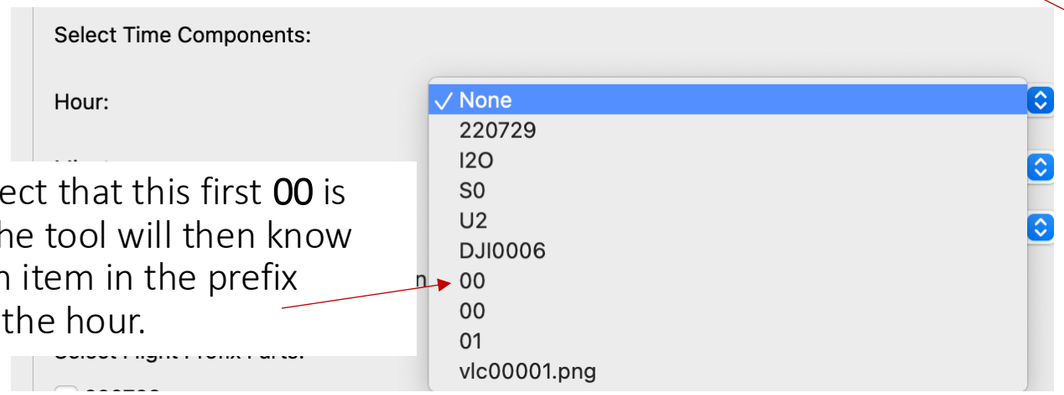
Image	VideoTime	GPS_Time	GPS_Date	FlightID	VideoID
220729_I2O_S0_U2_DJI0006_00_00_01_vlc00001.png	0:00:01	22:58:12	220729	220729_I2O_S0_U2	220729_I2O_S0_U2_DJI0006
220729_P4P_S0_U2_DJI0007_00_00_02_vlc00001.png	0:00:01	22:37:58	220729	220729_P4P_S0_U2	220729_P4P_S0_U2_DJI0007

Pull LiDAR Data for Videos: GPS time inputs part 3

We assume that you use the same delimiter throughout your image name (e.g. we use "_"). Type your delimiter into the box.

Once you enter the delimiter, several inputs will populate.

Each of these drop downs contains each section of your prefix as an option. For each Time Component input, select which section of the prefix represents the Hour, Minute, and Second.

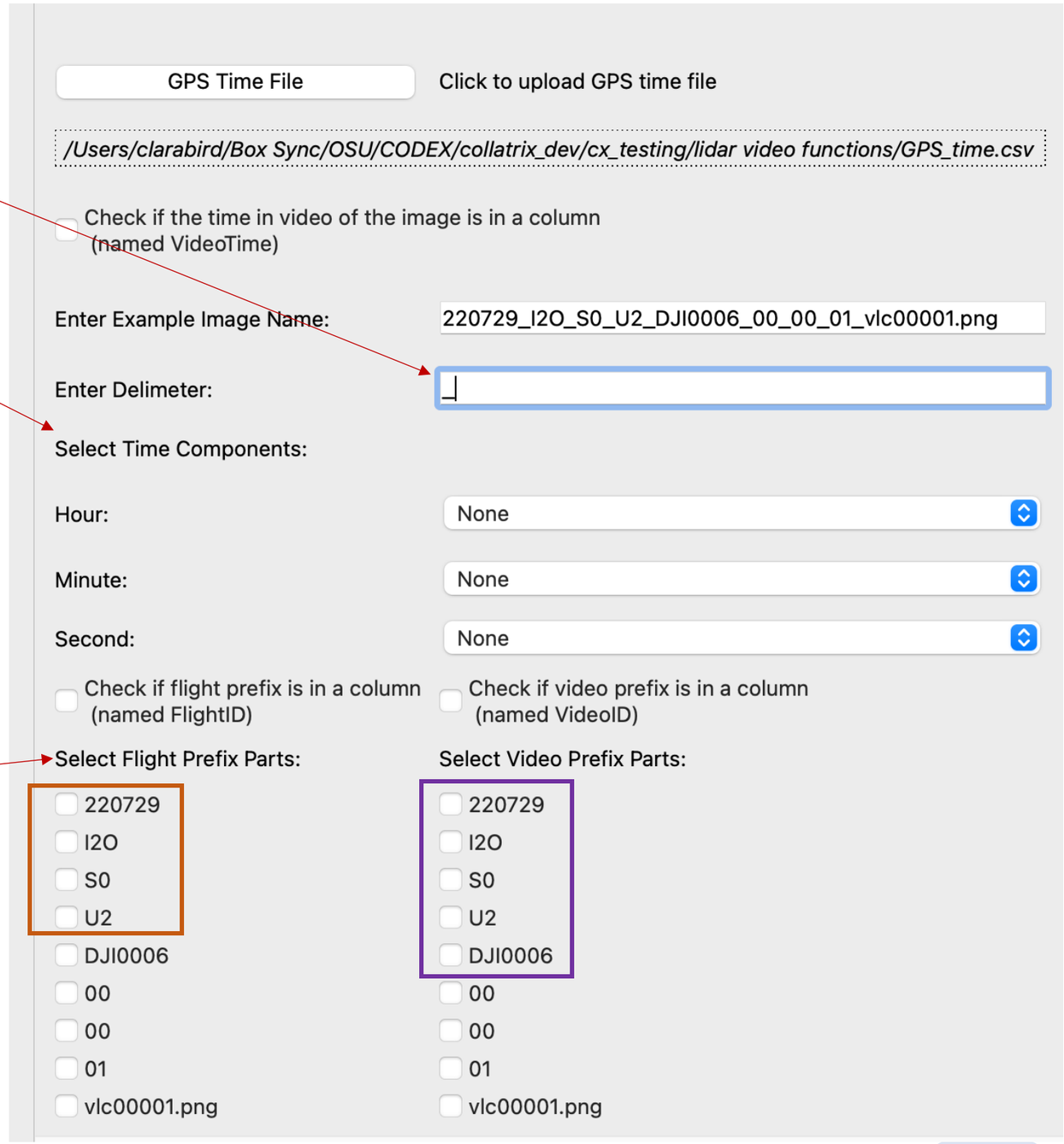


Here I'll select that this first 00 is the hour. The tool will then know that the 6th item in the prefix represents the hour.

Now you need to tell the tool which components of the prefix represent the Flight ID and the Video ID by checking each box that is part of the prefix. So for the Flight ID I'd check all these boxes, and for the Video ID I'd check all these boxes.

Now the tool will know that the first 4 objects in the prefix correspond to the flight ID and the first 5 objects correspond to the video ID.

Again, if you have columns in the GPS Time file that include this info, these steps are no necessary.

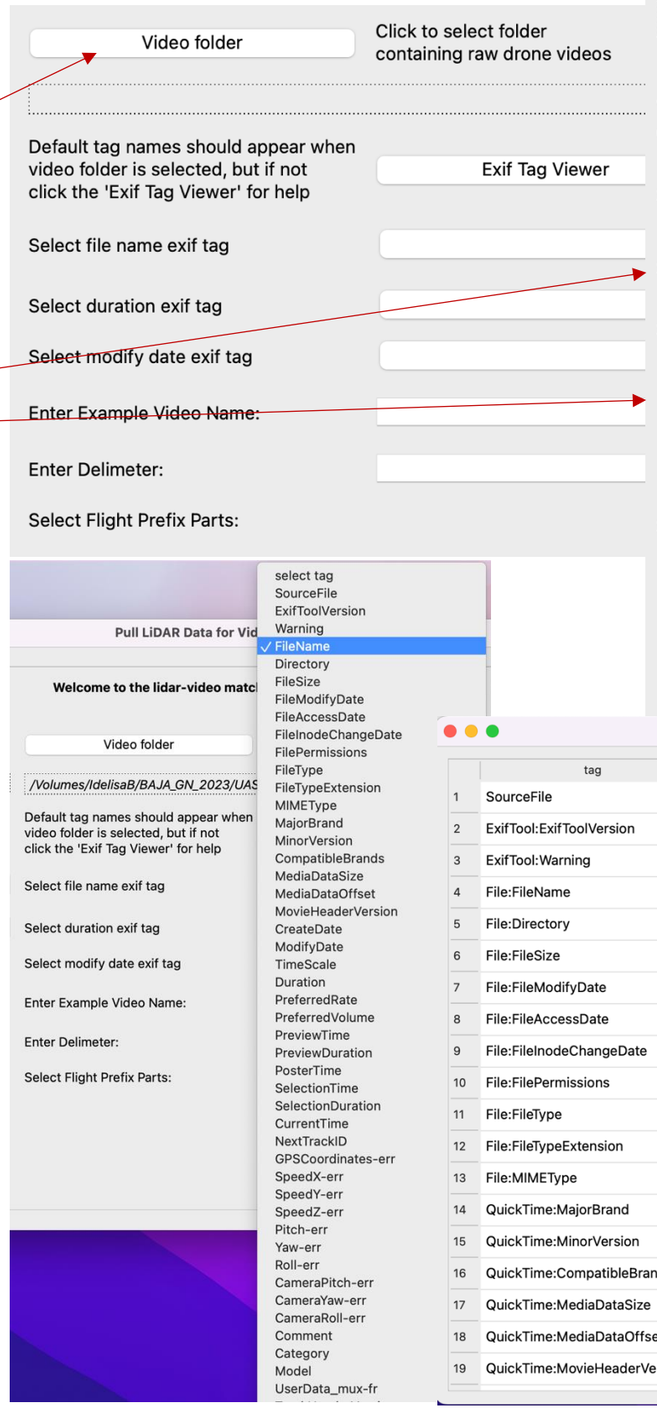


Pull LiDAR Data for Videos: Videos

This tool uses video metadata to pull the start time of the video in local time. We use this to calculate when the snapshot was taken by adding the time in video timestamp of the snapshot to the start time of the video.

Click this button and navigate to the folder containing your original drone videos. The file path will appear in the box below the button.

Once a folder has been selected the exif tag inputs and example video name will populate.



The tool needs three metadata items to run: the file name, the duration time, and the file modify date. If your video has the same metadata tags (metadata labels) as the videos we used to develop CollatriX (DJI drone footage), then it will automatically populate the fields with the tags.

If not, you'll need to **click the drop down and select the right tag name for each required tag.**

If you need help knowing which information each tag contains, click on the Exif Tag Viewer button (in blue box) and a table with appear in a separate window that displays the metadata for the first video in the video folder you selected. You can use this to select the appropriate tag for each required tag information.

You also need to tell the tool your delimiter and which components of the prefix represent the Flight ID. So, **type your delimiter into the box** and check the boxes for Flight ID.

Pull LiDAR Data for Videos: Lidar and Output

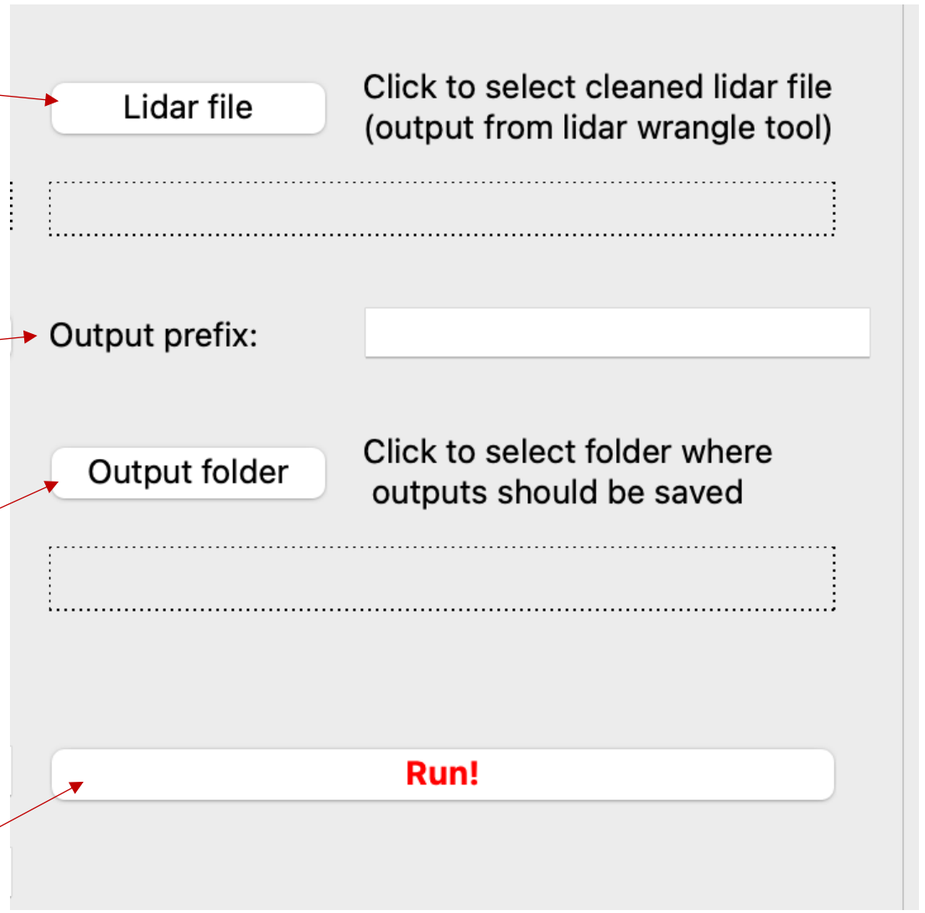
Click this button to navigate to and select the output file from the lidar wrangle tool. Remember its named *"prefix*_CleanedLidar.csv"

The file path will appear in the box below.

Type the file prefix you'd like in this text box. The output file will be named: *"prefix*_VideoLidar.csv"

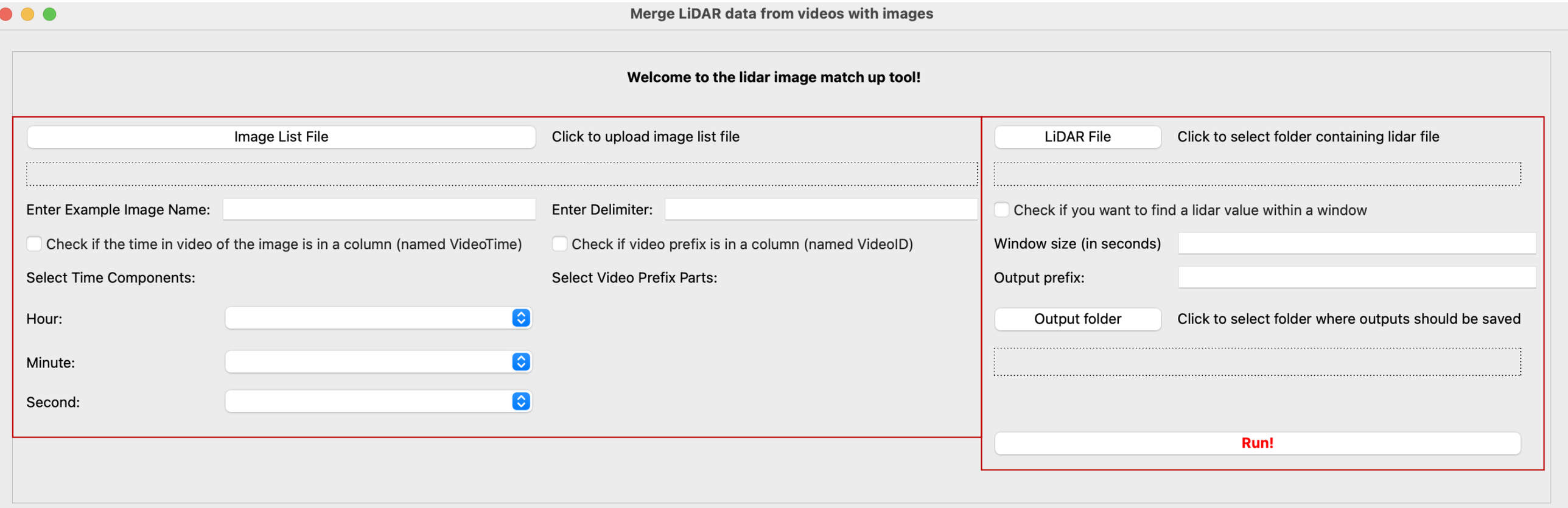
Click this button and navigate to the folder where you want the output file to be saved. The file path you select will be displayed in the box below.

Click this button to run the tool. A message will display below the button when it's done running.



Merge LiDAR Data for Videos

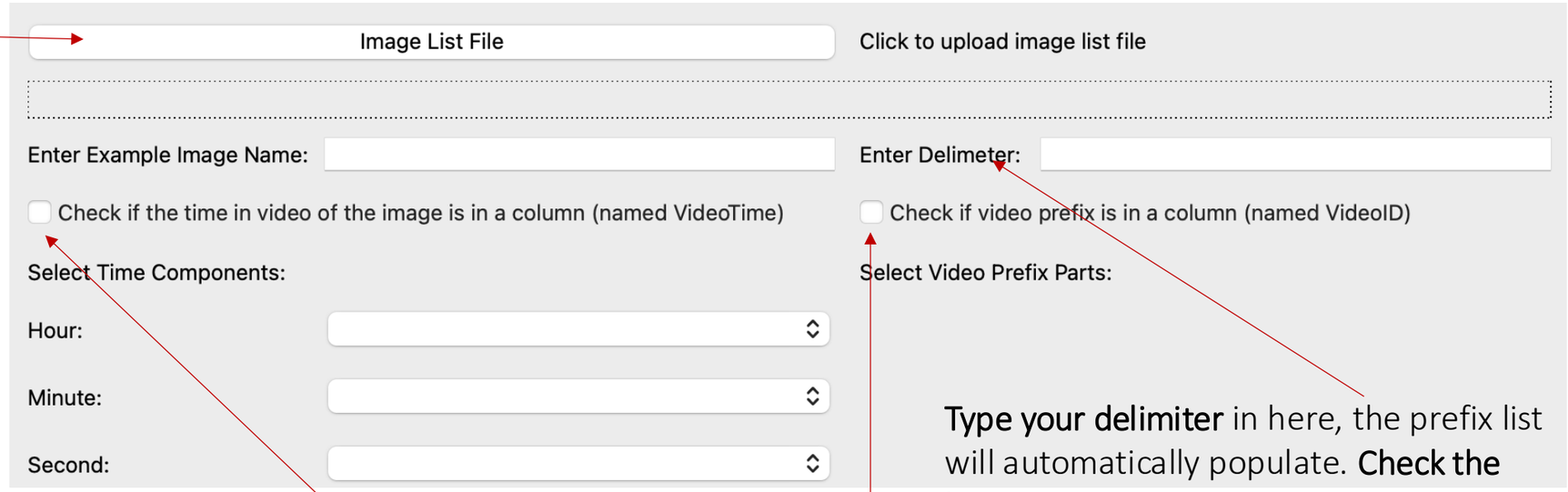
- This tool does a merge based on time of your image data and the video lidar data we just made in the last tool
  - It will output a csv with a laser altimeter altitude value for each image in a list you provide.
- What you'll need: An image list file and the Lidar file from the Pull LiDAR Data for video tool.



Merge LiDAR Data for Videos: Image List File

Click this button to navigate to and select your image list file. It should be formatted like the table shown below.

Once a file is selected the file path with be shown in the box below the button and the example image name will be populated.



Each of these drop downs contains each section of your prefix as an option. For each Time Component input, **select which section of the prefix represents the Hour, Minute, and Second**.

If you have a VideoTime column in your image list, don't select time components from the drop downs, just **check the box**.

Type your delimiter in here, the prefix list will automatically populate. **Check the boxes** for the components that make up the Video ID

Unless! You have that information as a column. **In that case, just check the box** for the video prefix being a column.

***Note**: Any other columns you have in the image list file will be included in the output, so if you have other metadata included, it won't be lost.*

Here I have the timestamp embedded in the name (00_00_01), meaning this snapshot was taken in the first second of the video

But this column contains the same information, **formatted HH:MM:SS**.

These columns contain information linking the image to the video it came from. If you have this information contained within the image name (as we do here) this column is not necessary.

Image name

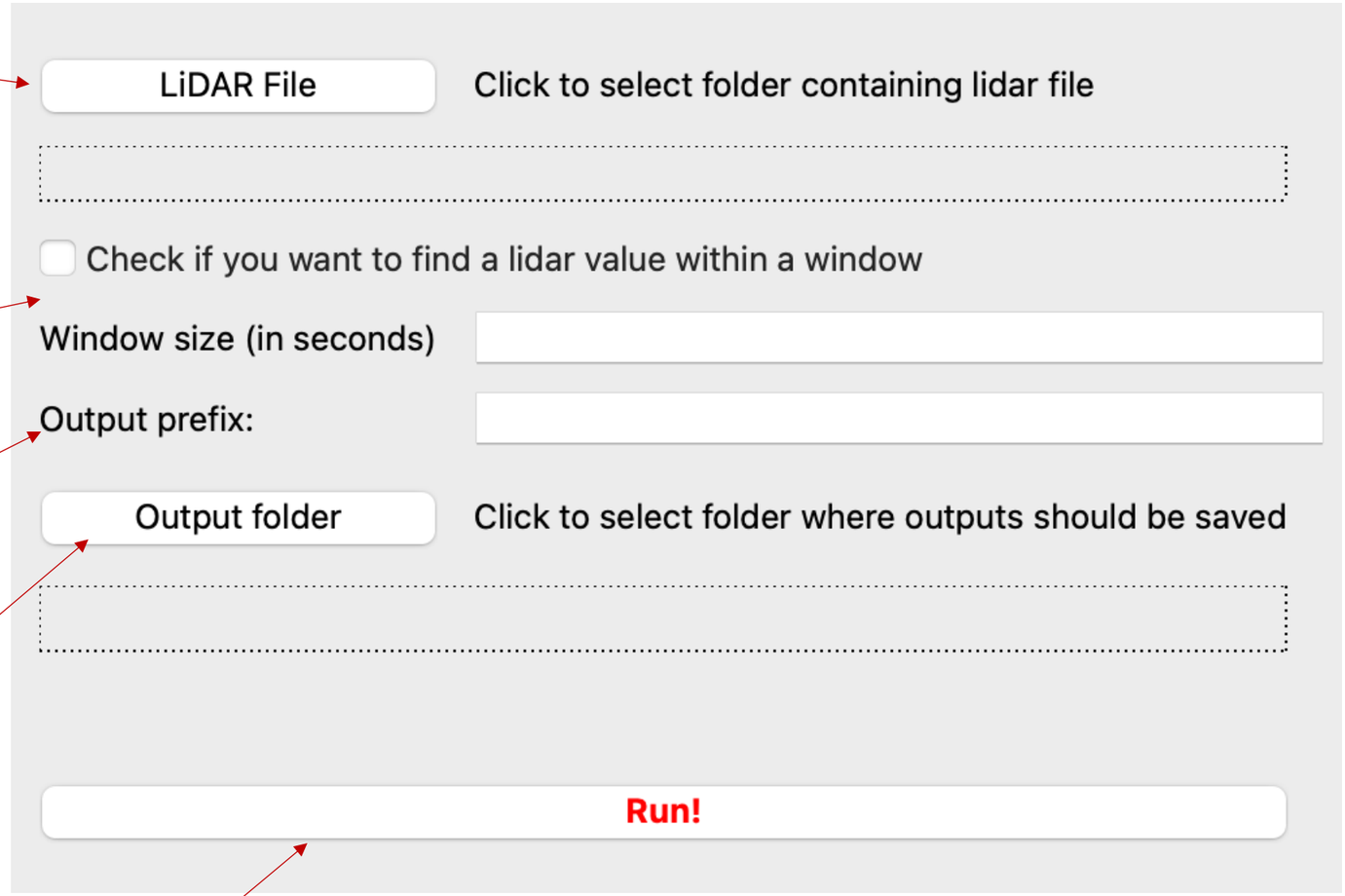
Image	VideoTime	VideoID
220729_I2O_S0_U2_DJI0006_00_01_21_vlc00001.png	0:01:21	220729_I2O_S0_U2_DJI0006
220729_I2O_S0_U2_DJI0006_00_02_01_vlc00001.png	0:02:01	220729_I2O_S0_U2_DJI0006

Merge LiDAR Data for Videos: Lidar and Output

Click this button to navigate to and select the output file from pull lidar for video tool. Remember its named *"prefix*_VideoLidar.csv"

The file path will appear in the box below.

Sometimes there's a missing lidar value at the exact second of a photo (due to an error), but there's an available value within a few seconds. If you'd like to pull the nearest lidar value within a few seconds, **check the box** and **enter the number of seconds** you'd like to look for a lidar value before and after the image time (i.e., if the image was taken at 00:02:45, and the window size is 10, the code will look for the nearest lidar value within 00:02:35-00:02:55)



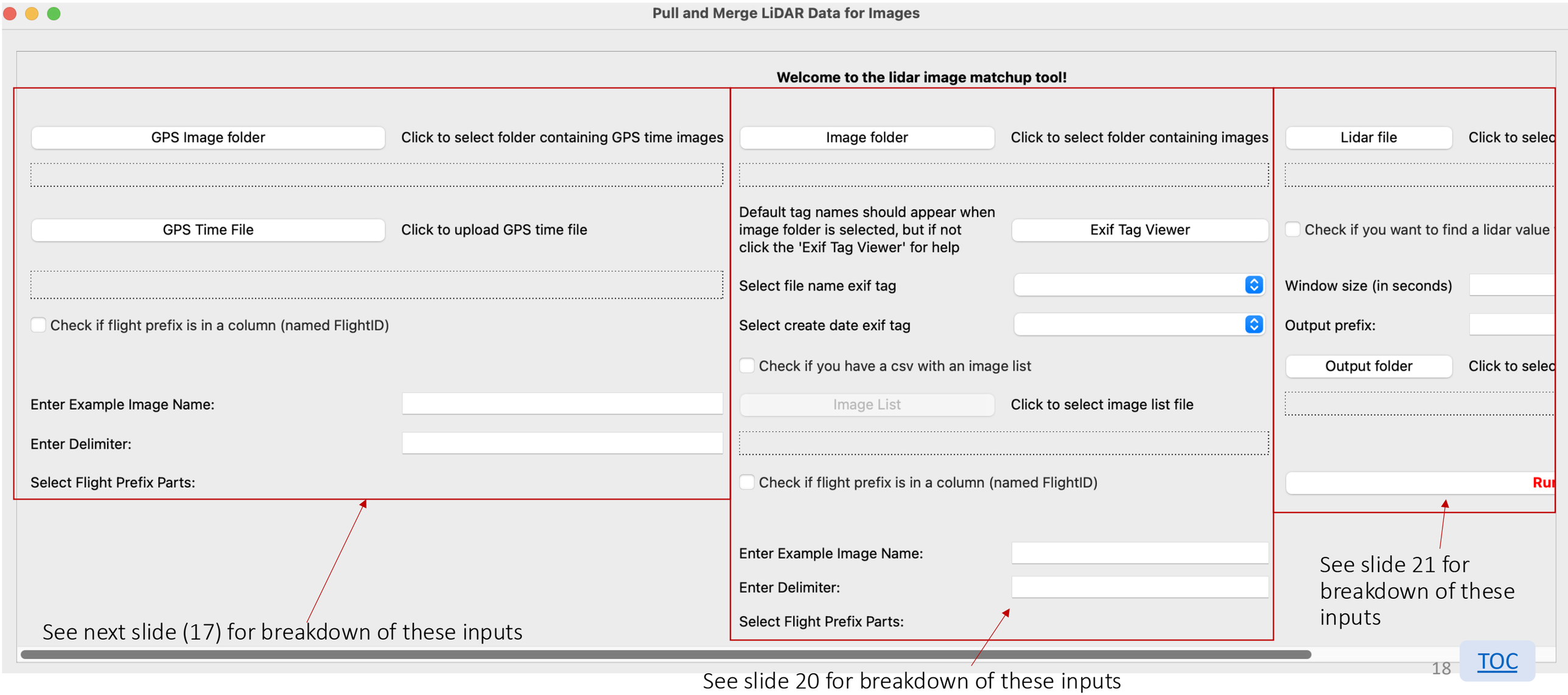
Type the file prefix you'd like in this text box. The output file will be named: *"prefix*_LidarMerge.csv"

Click this button and navigate to the folder where you want the output file to be saved. The file path you select will be displayed in the box below.

Click this button to run the tool. A message will display below the button when it's done running.

Pull/Merge LiDAR Data for Images

- This tool requires a lot of inputs. We'll walk through them in the next several slides but this is what the complete window looks like when you open it.
- What you'll need: A folder of GPS snapshots, a GPS time file, all your images in one folder, an image list (optional),and the Lidar file from the Wrangle Lidar tool.



See next slide (17) for breakdown of these inputs

See slide 20 for breakdown of these inputs

See slide 21 for breakdown of these inputs

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Pull/Merge LiDAR Data for Images: GPS Time inputs part 1

- Camera clocks on drones are often inaccurate and/or have a lot of drift. So, to make sure that we can properly align our snapshot timestamps with the LiDAR timestamps (come from GPS satellite unit), we follow these steps:
  - We take a picture of GPS clock at the start of the flight with the drone
  - We manually type the time on the clock in the image into a column in our GPS Time file.
- Let's break down an example GPS Time file
  - Note that your column headers must be **spelled and capitalized exactly as shown here.**
    - The contents of the following columns **must also be formatted as shown here**: GPS_Time, and GPS_Date

Image name

This column is the time displayed on the clock that was filmed in the snapshot. **Formatted as HH:MM:SS**.

This column is the date displayed on the clock that was filmed in the snapshot **formatted as YYMMDD**.

These columns contain information linking the image to the flight the image came from. If you have this information contained within the image name (as we do here) this column is not necessary.

Image	GPS_Time	GPS_Date	FlightID
220729_I2O_S0_U2_DJI0001.png	22:58:12	220729	220729_I2O_S0_U2
220729_P4P_S0_U2_DJI0002.png	22:37:58	220729	220729_P4P_S0_U2

Pull/Merge LiDAR Data for Images: GPS Time inputs part 2

Click this button and select the folder containing all your GPS time images (images of the clock). The selected file path will appear in the box below.

Click this button and select the GPS time file you've set up (detailed on previous slide). The file path will appear in the box below the button. The first image in the list will appear in the Example Image name. The selected file path will appear in the box below.

If you have a FlightID column, **check the box**. You won't need to select flight prefix parts.

If you have the information in the image name, don't check the boxes, go to the next slide.

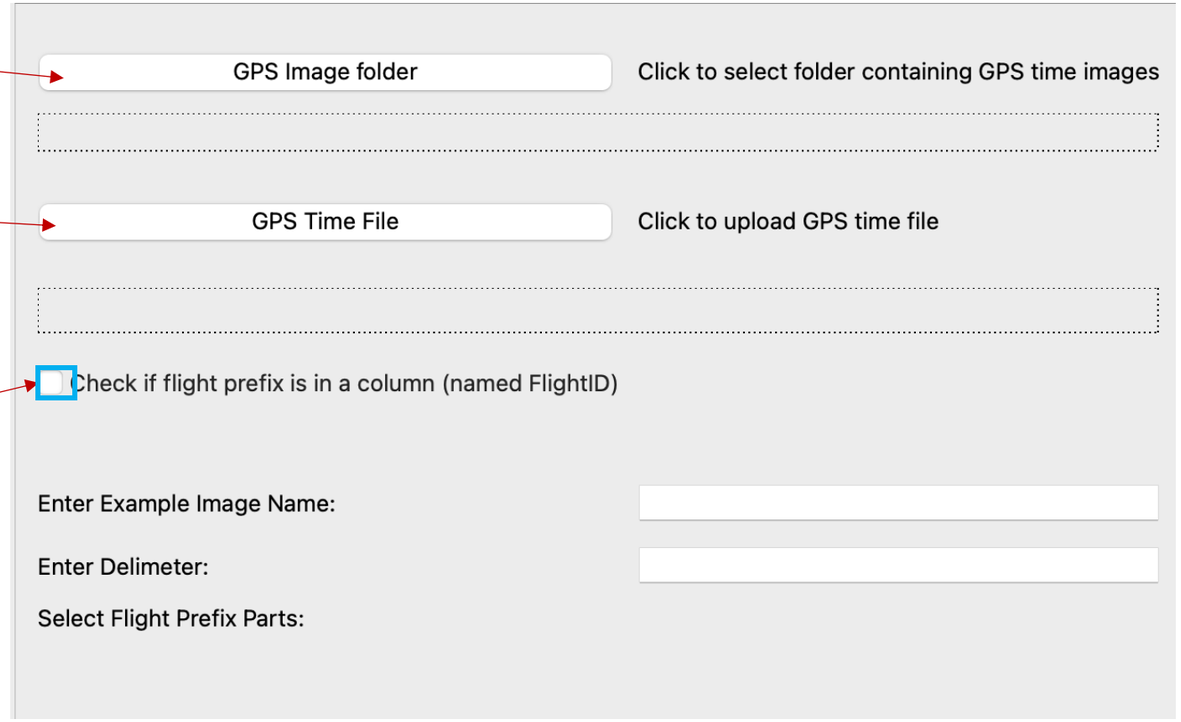
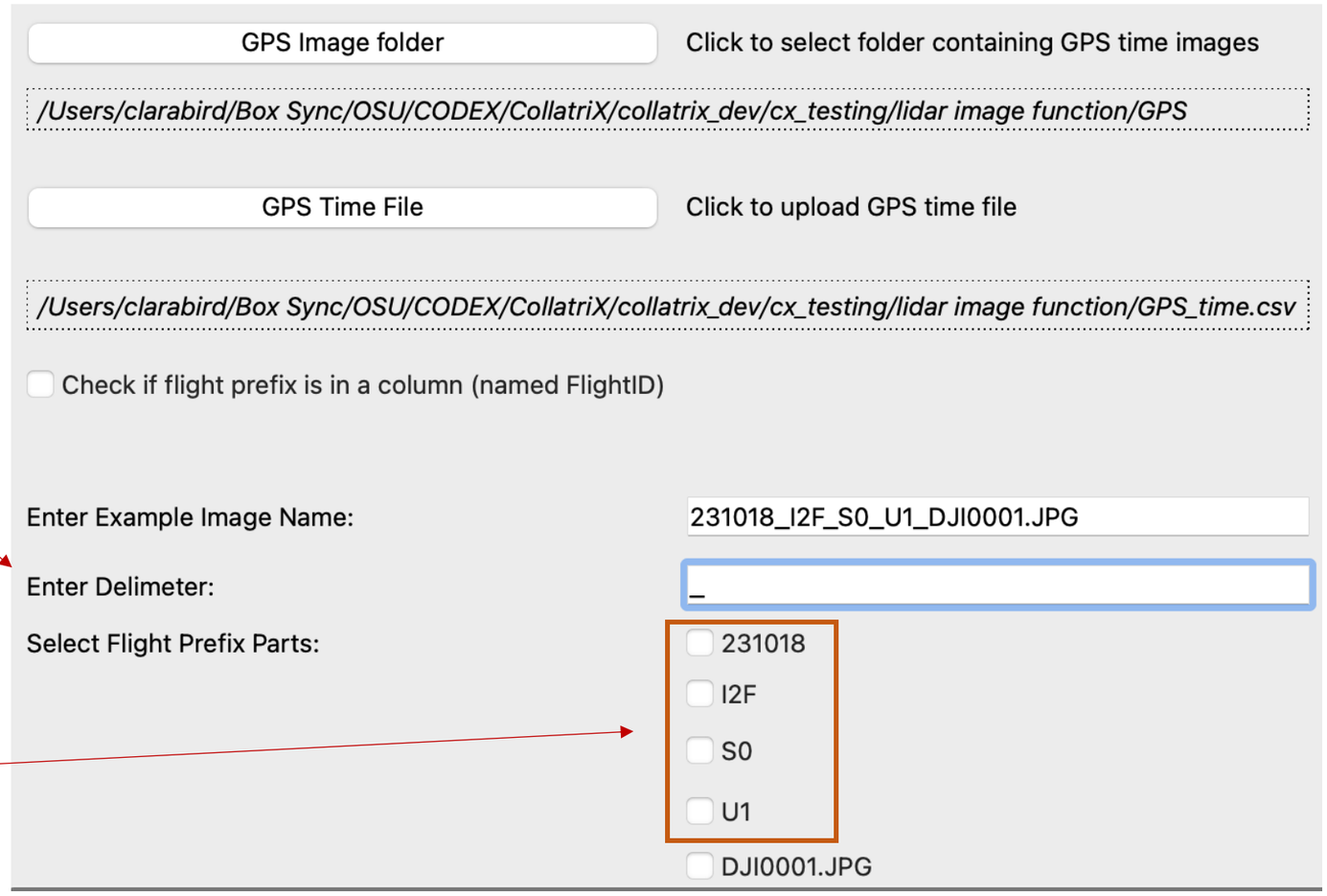


Image	GPS_Time	GPS_Date	FlightID
220729_I2O_S0_U2_DJI0001.png	22:58:12	220729	220729_I2O_S0_U2
220729_P4P_S0_U2_DJI0002.png	22:37:58	220729	220729_P4P_S0_U2

Pull/Merge LiDAR Data for Images: GPS time inputs part 3

We assume that you use the same delimiter throughout your image name (e.g. we use "_"). Type your delimiter into the box.

Once you enter the delimiter, the list of prefix parts will appear.



Now you need to tell the tool which components of the prefix represent the Flight ID by checking each box that is part of the prefix. So for the Flight ID I'd check all these boxes

Now the tool will know that the first 4 objects in the prefix correspond to the flight ID.

Again, if you have columns in the GPS Time file that include this info, these steps are no necessary.

Pull LiDAR Data for Images: Images part 1

This tool reads the image metadata to determine it's start time.

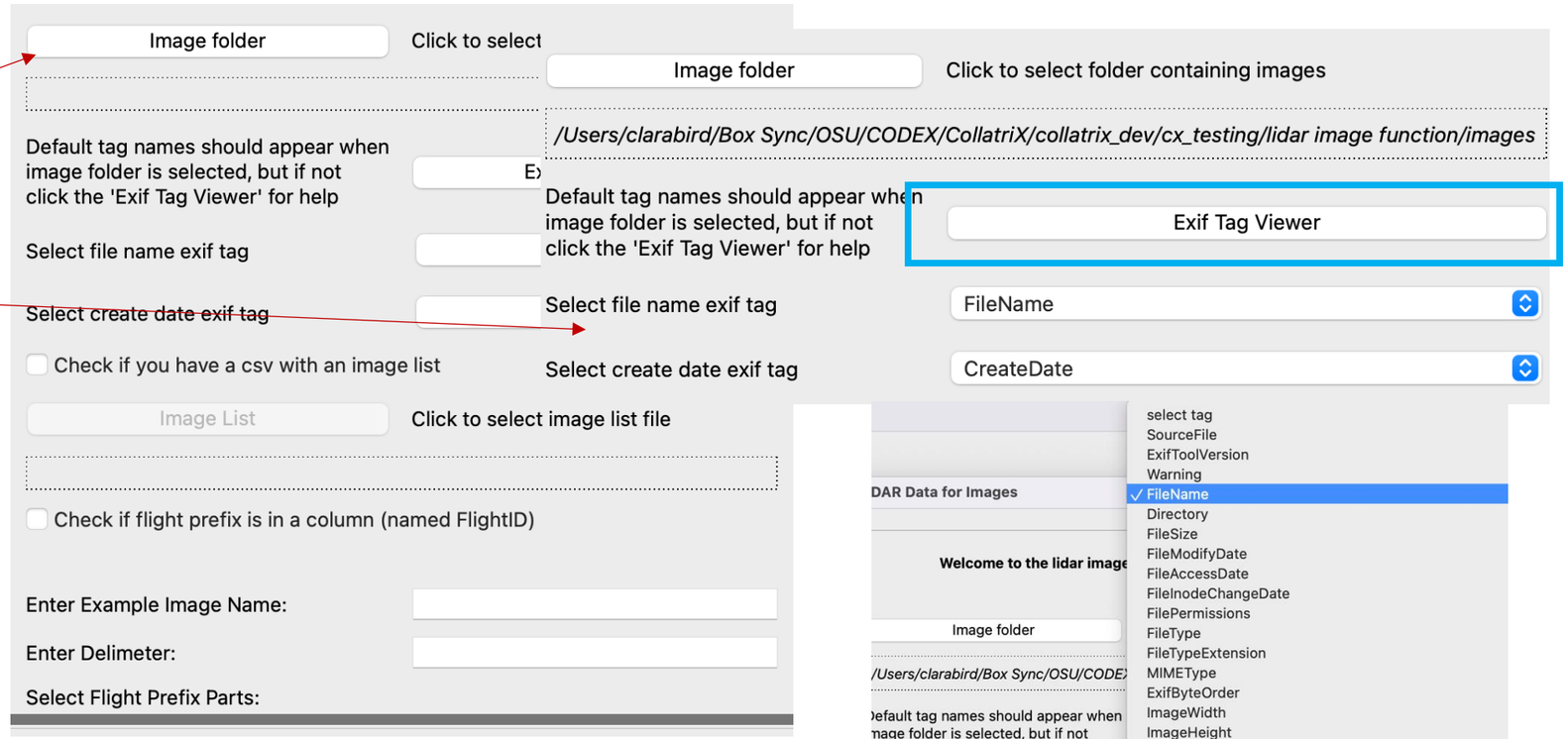
Click this button and navigate to the folder containing your images. The file path will appear in the box below the button.

Once a folder has been selected the exif tag inputs and example image name will populate

The tool needs two metadata items to run: the file nam and the file create date. If your image has the same metadata tags (metadata labels) as the images we used to develop CollatriX (DJI drone images), then it will automatically populate the fields with the tags.

If not, you'll need to **click the drop down and select the right tag name for each required tag.**

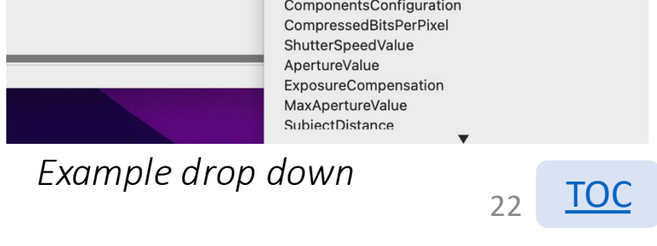
If you need help knowing which information each tag contains, click on the Exif Tag Viewer button (in blue box) and a table with appear in a separate window that displays the metadata for the first image in the image folder you selected. You can use this to select the appropriate tag for each required tag information.



Example Exif Tag Viewer

ExifTag Viewer

	tag	value
1	SourceFile	/Users/clarabird/Box ...
2	ExifTool:ExifToolVers...	12.76
3	ExifTool:Warning	[minor] Possibly ...
4	File:FileName	231018_I2F_S0_U1_DJI...
5	File:Directory	/Users/clarabird/Box ...
6	File:FileSize	6490672
7	File:FileModifyDate	2023:10:18 ...
8	File:FileAccessDate	2024:01:30 ...
9	File:FileInodeChang...	2023:10:18 ...
10	File:FilePermissions	100777
11	File:FileType	JPEG



Example drop down

Pull/Merge LiDAR Data for Images: Images part 2

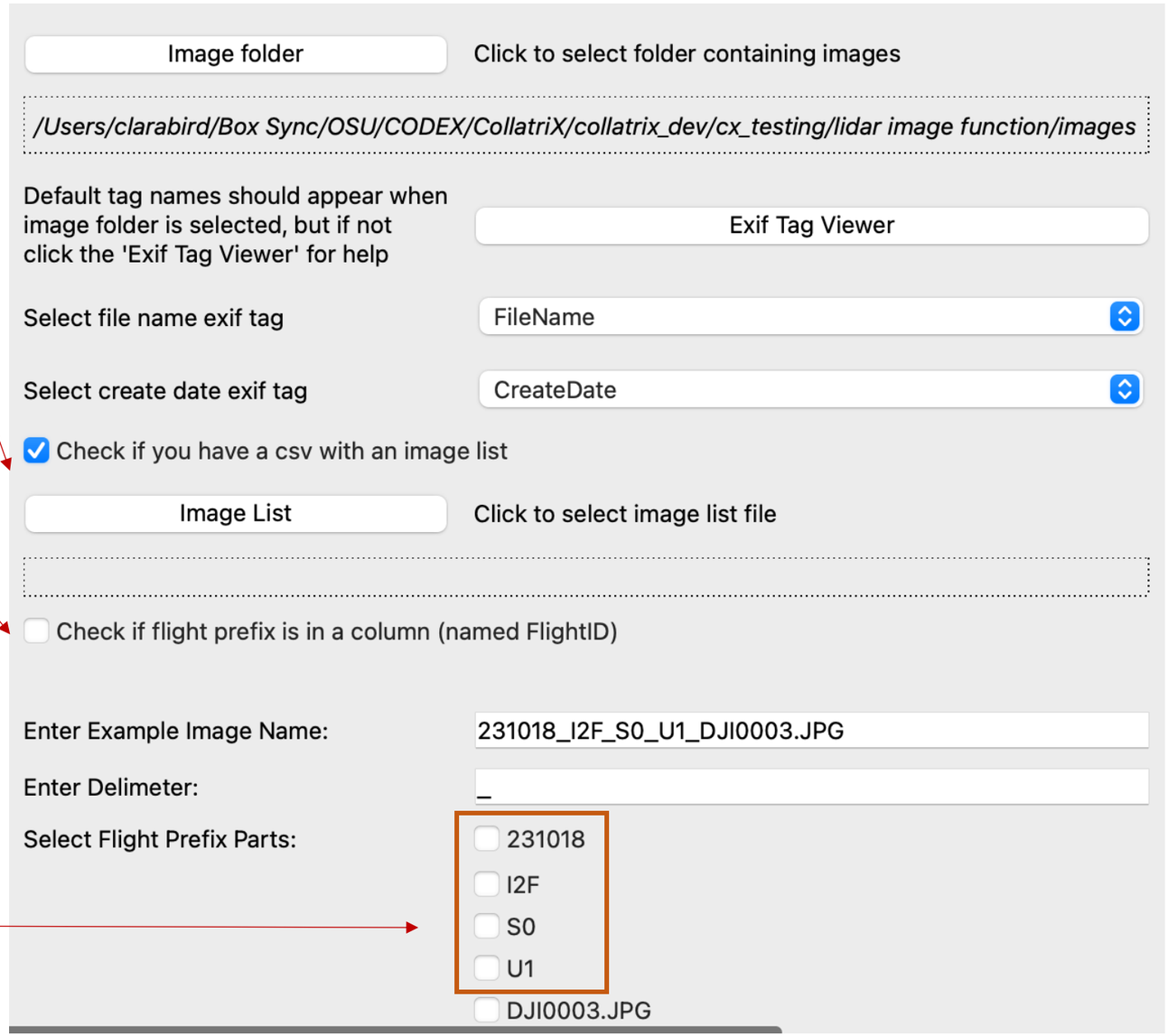
You don't have to provide a list of images as a spreadsheet, but if you already have some linked metadata and want to add the laser altitude to it, you can upload an image list by **checking the box** for image list and **clicking the Image List button** to select your file.

If you have a FlightID column (like in GPS time), **check the box** and don't select flight prefix parts

If you don't have a FlightID column, you'll need to select prefix parts.

After entering your delimiter in the text box, the prefix parts list will populate.

Now you need to tell the tool which components of the prefix represent the Flight ID by checking each box that is part of the prefix. So for the Flight ID I'd check all these boxes
Now the tool will know that the first 4 objects in the prefix correspond to the flight ID.
Again, if you have columns in the Image List that include this info, these steps are no necessary.



Pull/Merge LiDAR Data for Videos: Lidar and Output

Click this button to navigate to and select the output file from pull lidar for wrangle tool. Remember its named *"prefix*_LidarCleaned.csv"

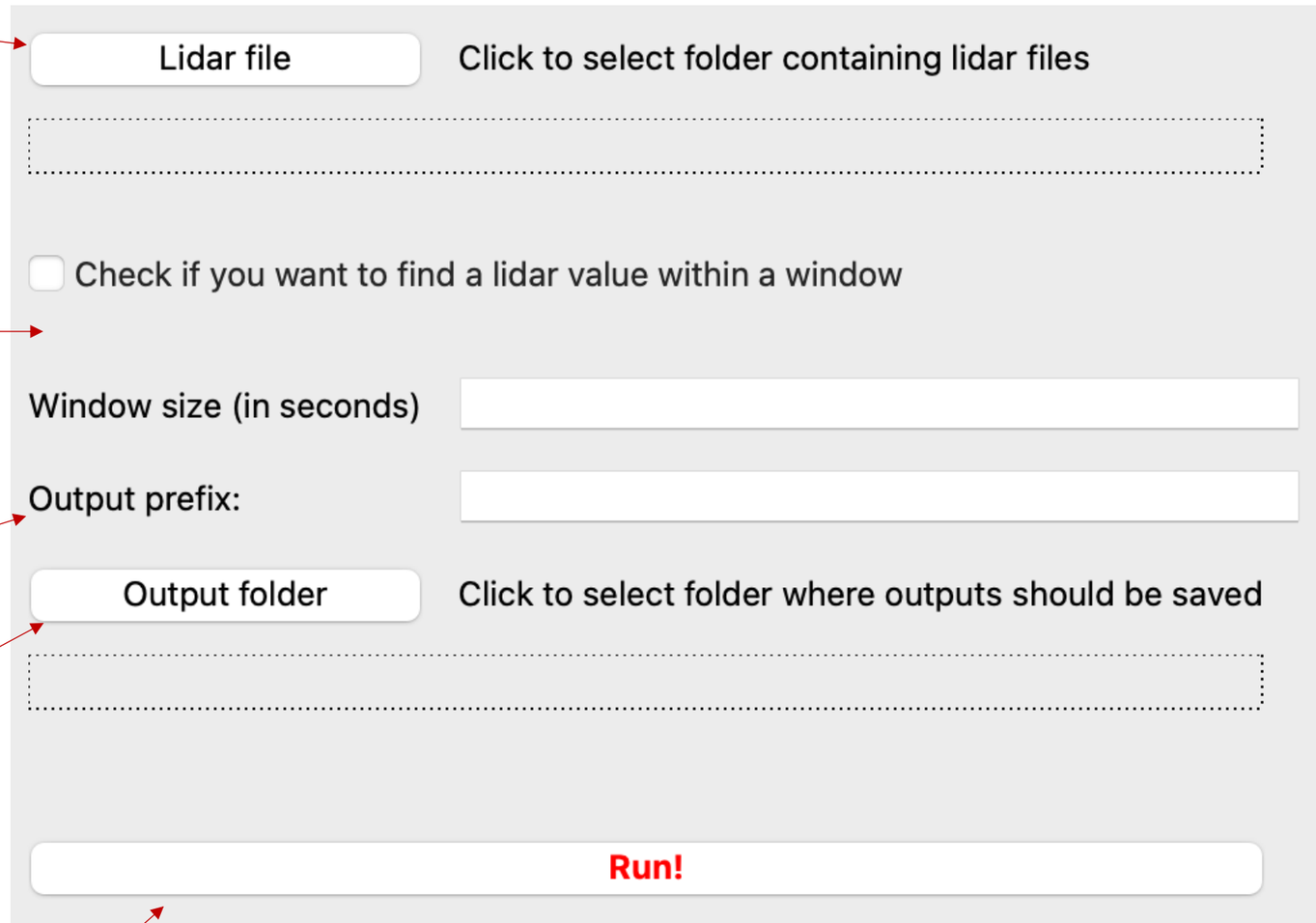
The file path will appear in the box below.

Sometimes there's a missing lidar value at the exact second of a photo (due to an error), but there's an available value within a few seconds. If you'd like to pull the nearest lidar value within a few seconds, **check the box** and **enter the number of seconds** you'd like to look for a lidar value before and after the image time (i.e., if the image was taken at 00:02:45, and the window size is 10, the code will look for the nearest lidar value within 00:02:35-00:02:55)

Type the file prefix you'd like in this text box. The output file will be named: *"prefix*_ImageLidar.csv"

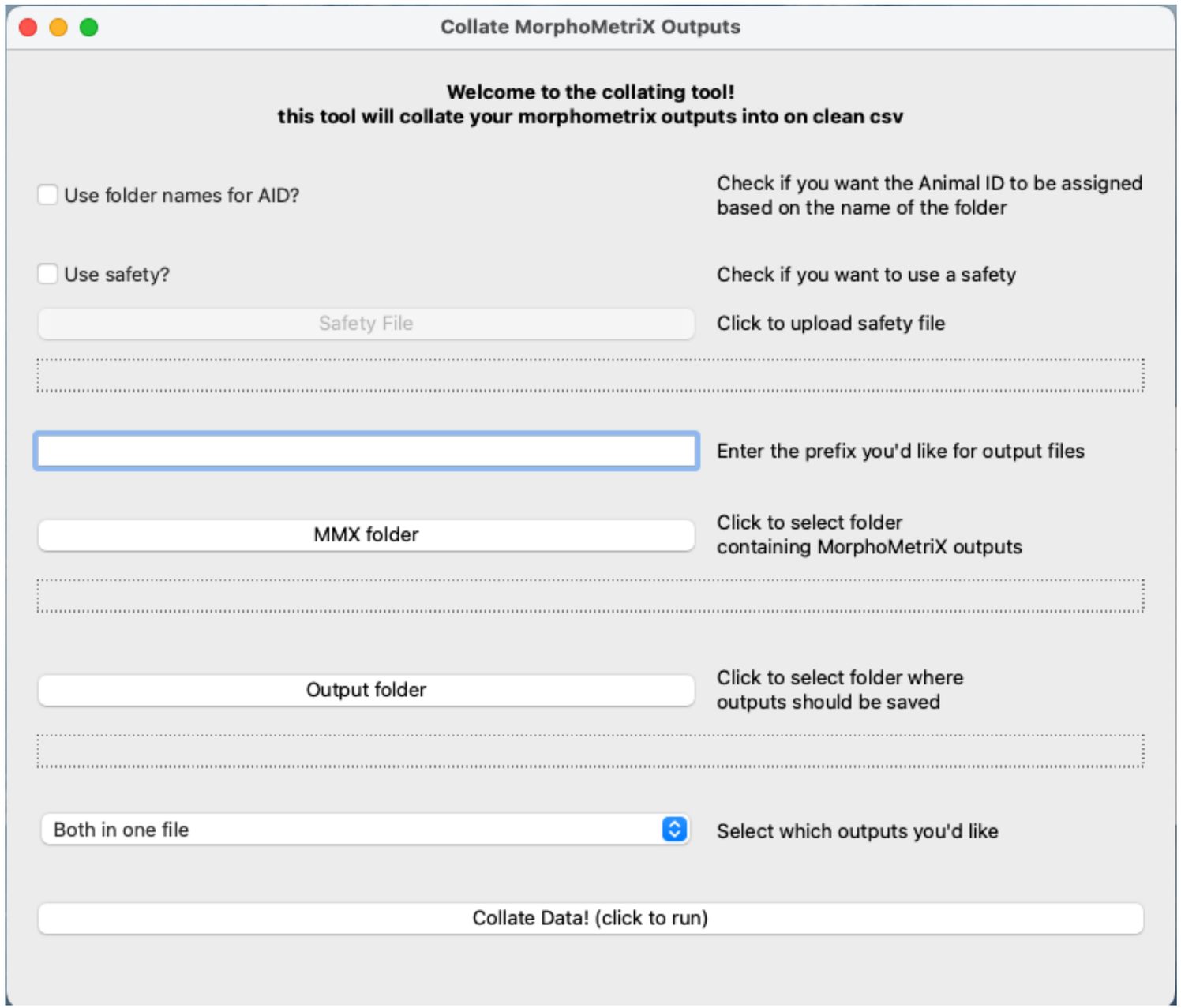
Click this button and navigate to the folder where you want the output file to be saved. The file path you select will be displayed in the box below.

Click this button to run the tool. A message will display below the button when it's done running.



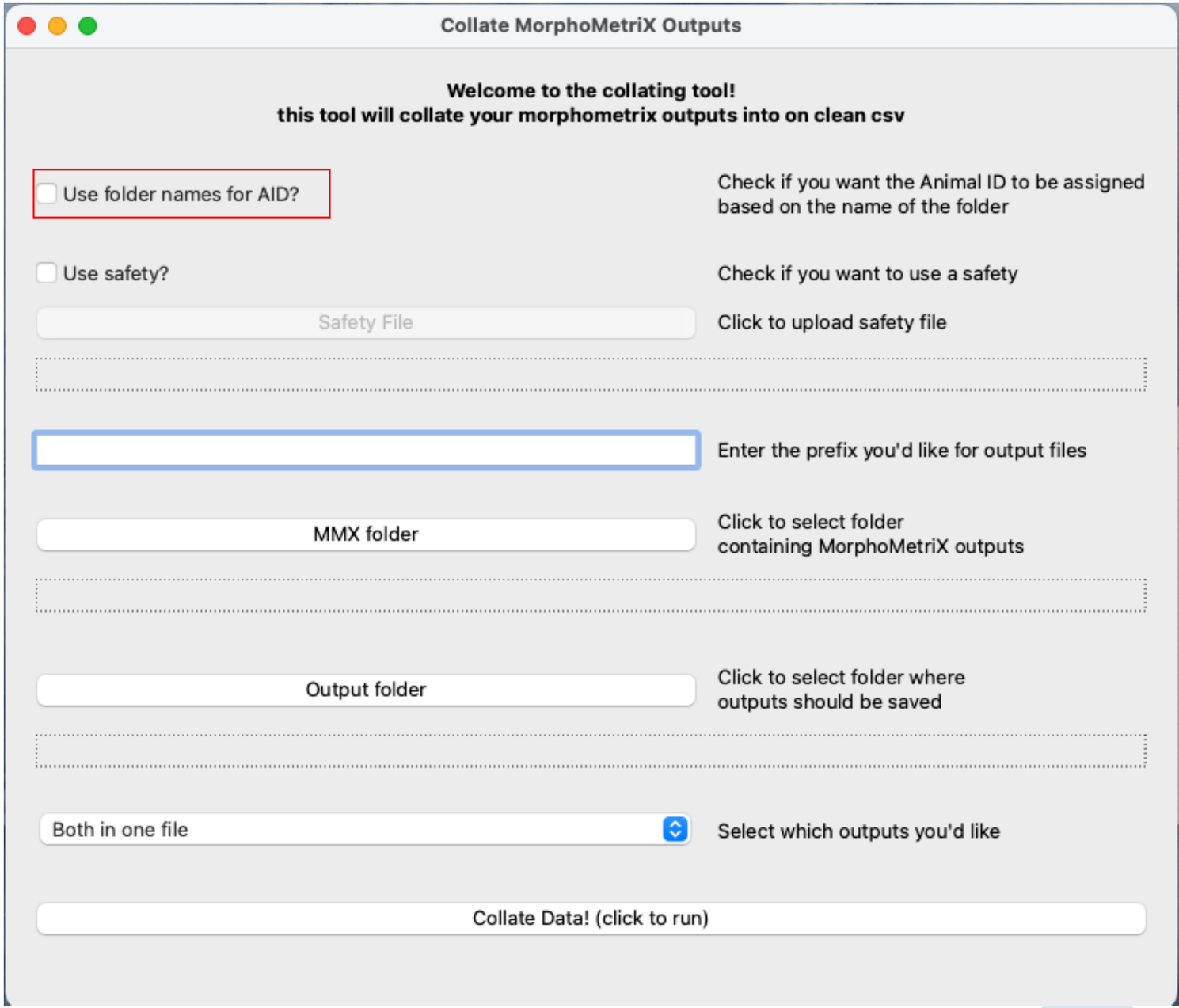
Collate MMX Outputs Function

- Here we have all the same inputs as the original function, just combined into one window!
- Details in the next few slides



Collate MMX Outputs: Use AID?

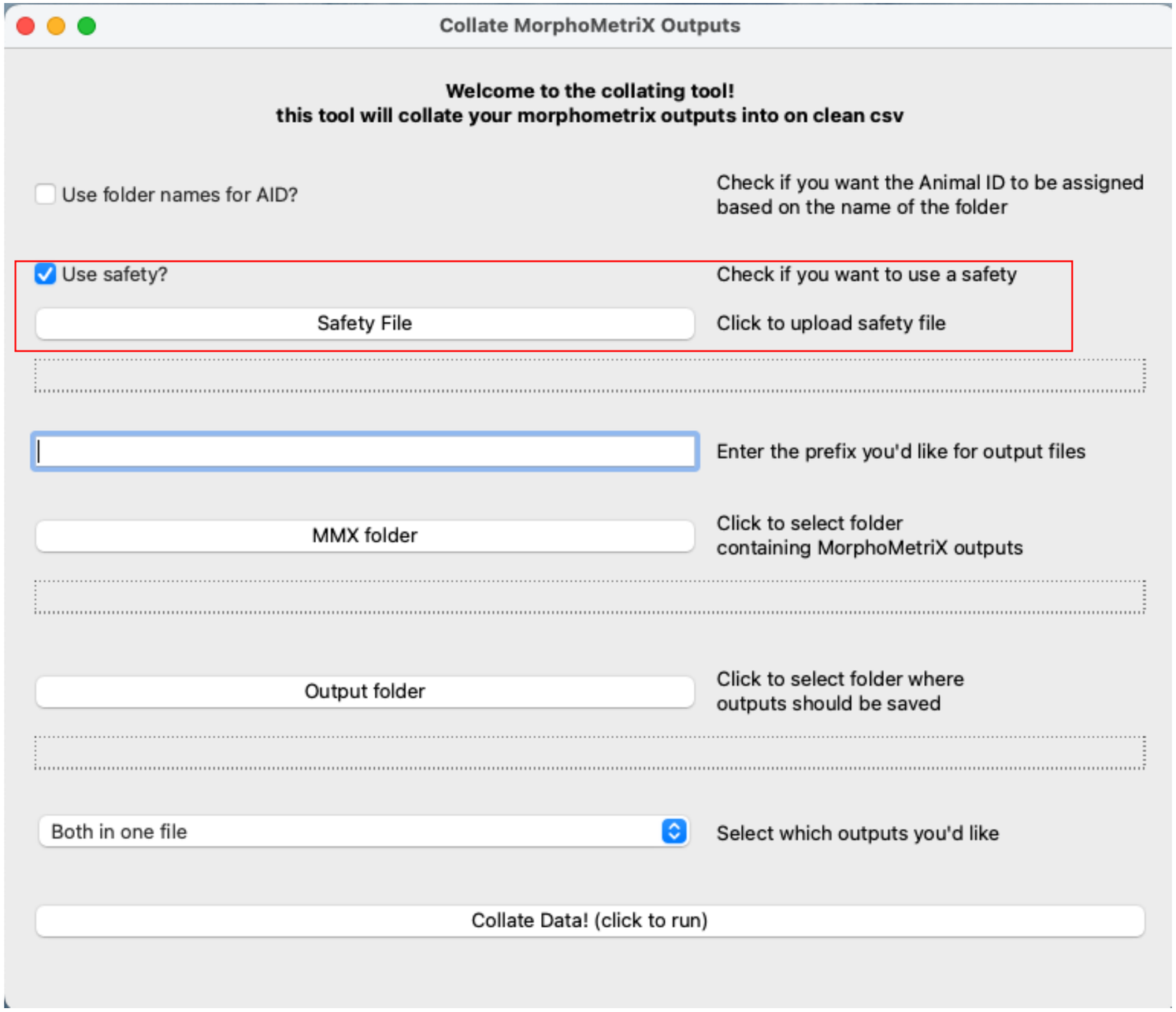
- Use folder names for AID?
  - MorphoMetriX output csvs can be saved in any file structure. The function will search through all folders within the folder provided and pull all csvs. If you have saved the outputs within folders named using Animal IDs, you can choose to have the Animal ID be pulled from the folder name. If the box is unchecked, the Animal ID will be the 'Image ID' manually entered through MorphoMetriX.
- An example of a file structure where the folders are named using the Animal ID is:
- Whale1
  > image_name1.jpg
  > image_name1.csv
- Whale2
  > image_name2.jpg
  > image_name2.csv



Collate MMX Outputs: Safety

Use safety?

- Because it's easy to accidentally enter the wrong altitude, focal length, or pixel dimension in MorphoMetriX, this function can recalculate the measurements using the correct values. **Checking the box** for this input will have the function recalculate, using values that you will need to provide through an additional csv. If you check the box, the “Safety File” button will become active, and **you can click on that button to select your safety file.**



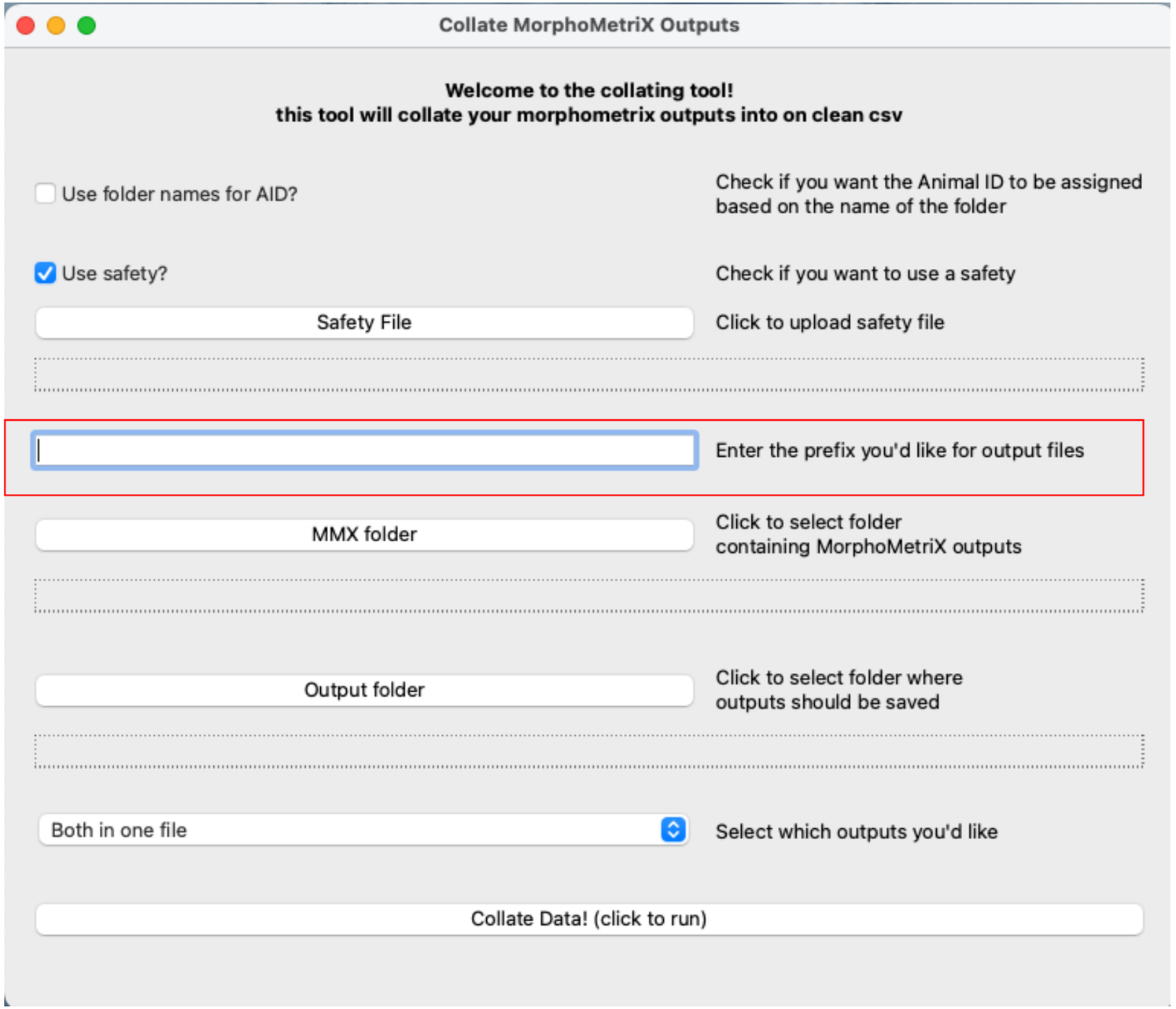
How to format this csv (note: header spelling and capitalization matters most)

- Required columns (spelled and capitalized just as written here): Image, Altitude, Focal_Length, Pixel_Dimension
- Make sure that the image names are identical to the name of the images measured (be mindful of capitalization, *especially of the file extensions*, .JPG and .jpg would not be considered matching).

Image	Altitude	Focal_Length	Pixel_Dimension
whale1.JPG	55.0	35	0.0039
whale2.JPG	40.0	35	0.0039

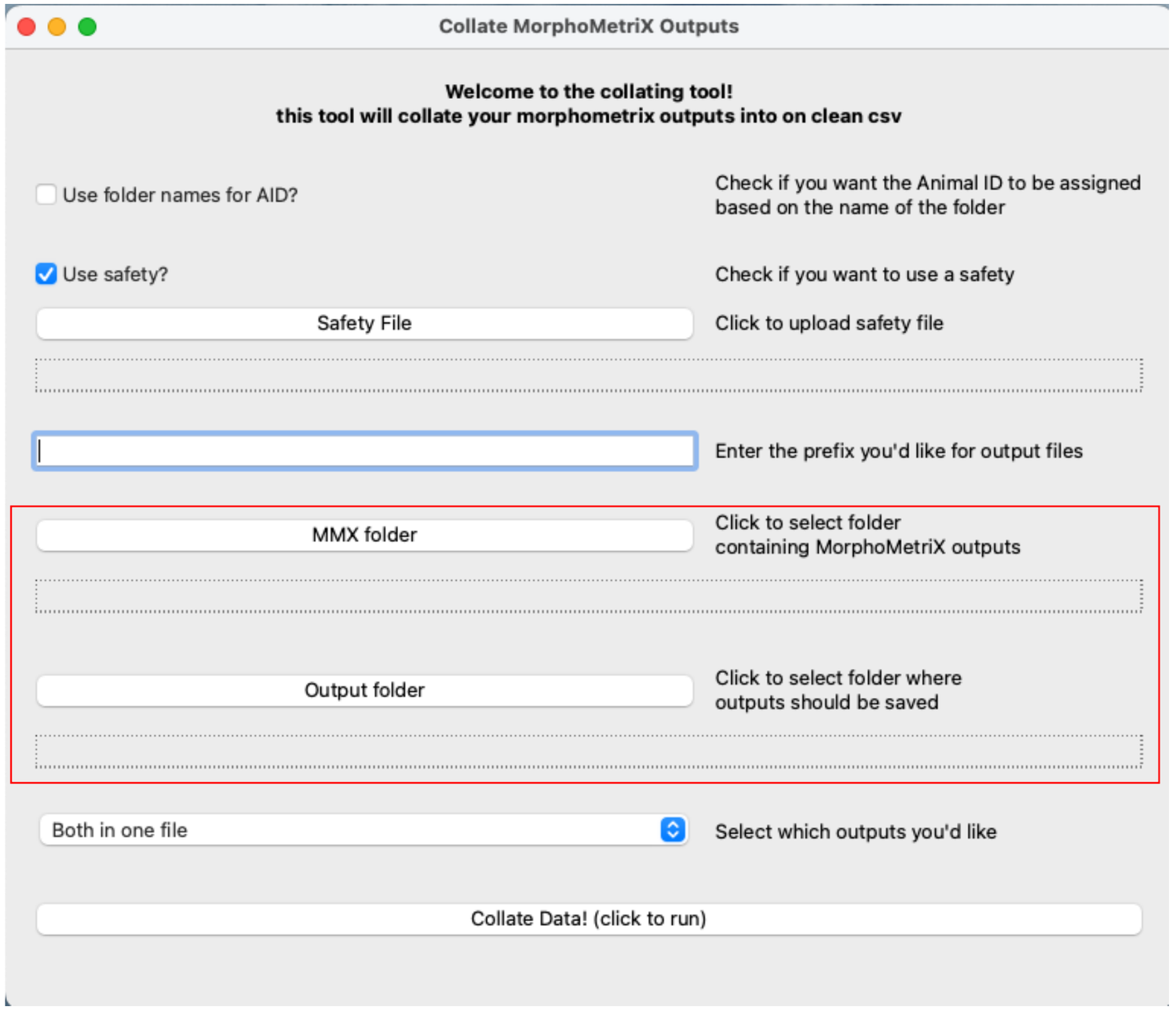
Collate MMX Outputs: Prefix

- Prefix
  - Type in the prefix you would like added to the output files



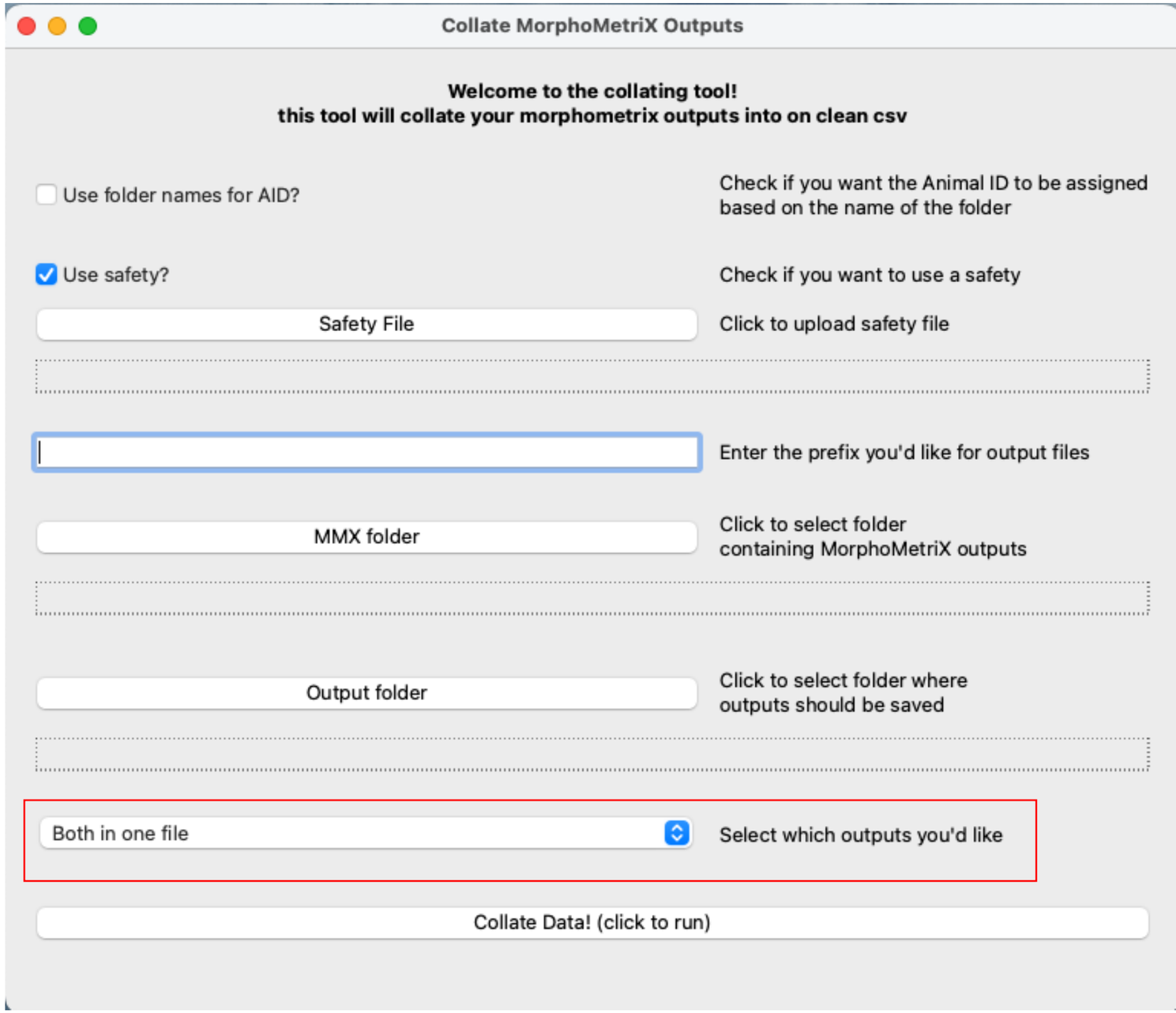
Collate MMX Outputs: File paths

- Select file paths
- MMX folder
  - Click on this button to select the folder where the morphometrix outputs you want to collate are located.
  - Note – if there are non-mmx outputs in the folder that's ok, collatrix will ignore them
- Output folder
  - Click on this button to select the folder where you want the outputs to be saved



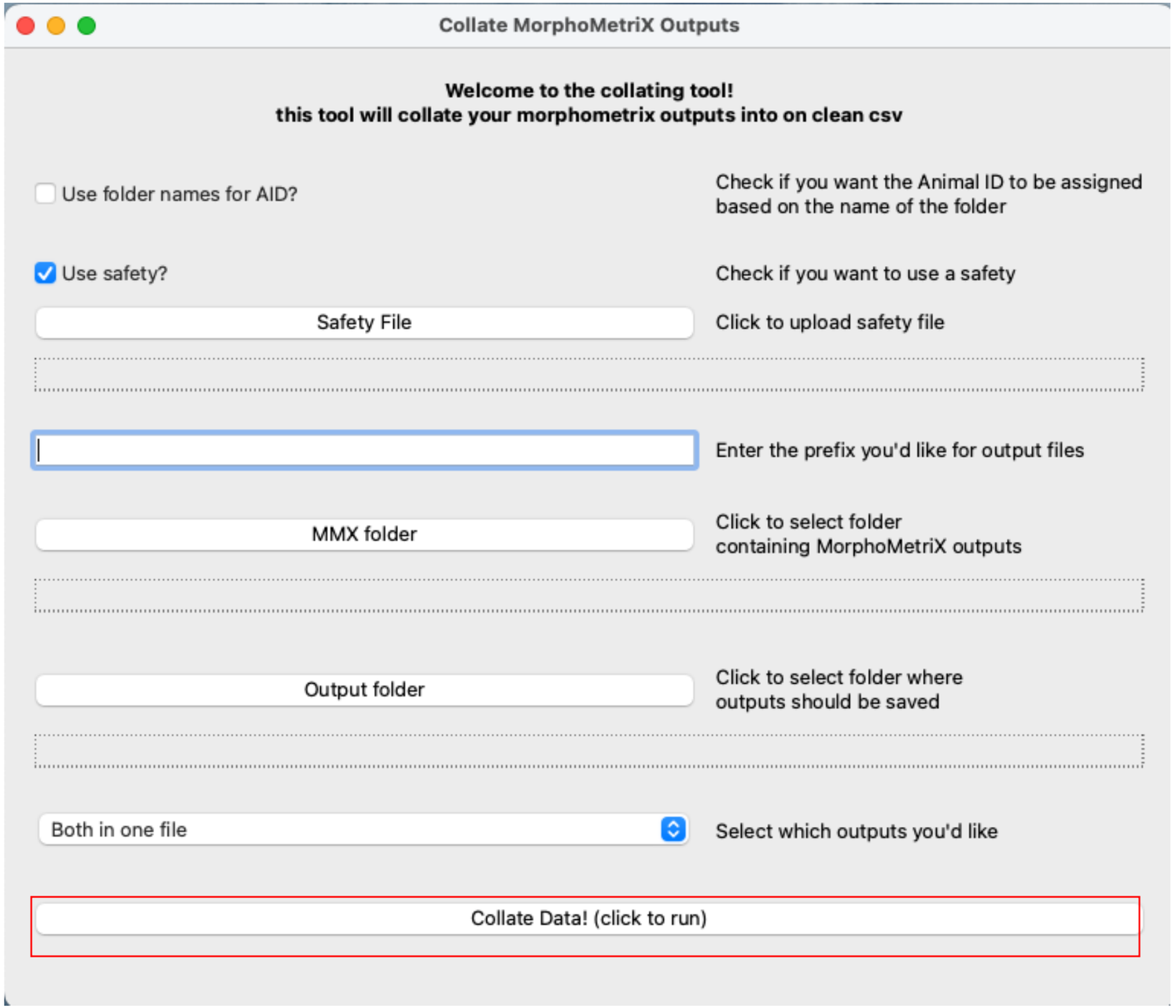
Collate MMX Outputs: Output format

- Select output format
  - CollatriX creates a dataframe of the measurements in pixels and one in meters, you can select how you want these outputted
  - The drop down includes 4 options
    - Both in one file: both meters and pixels in one csv with column headers indicates whether its meters or pixels
    - Both in separate files: one csv containing measurements in meters, one containing the pixel counts
    - Just meters: just one csv containing measurements in meters
    - Just pixels: just one csv containing measurements in pixels
  - All outputs will include the metadata inputted into morphometrix (Image ID, altitude, notes etc)
- CollatriX will also output a processing notes file with a record of what you inputted into this CollatriX window



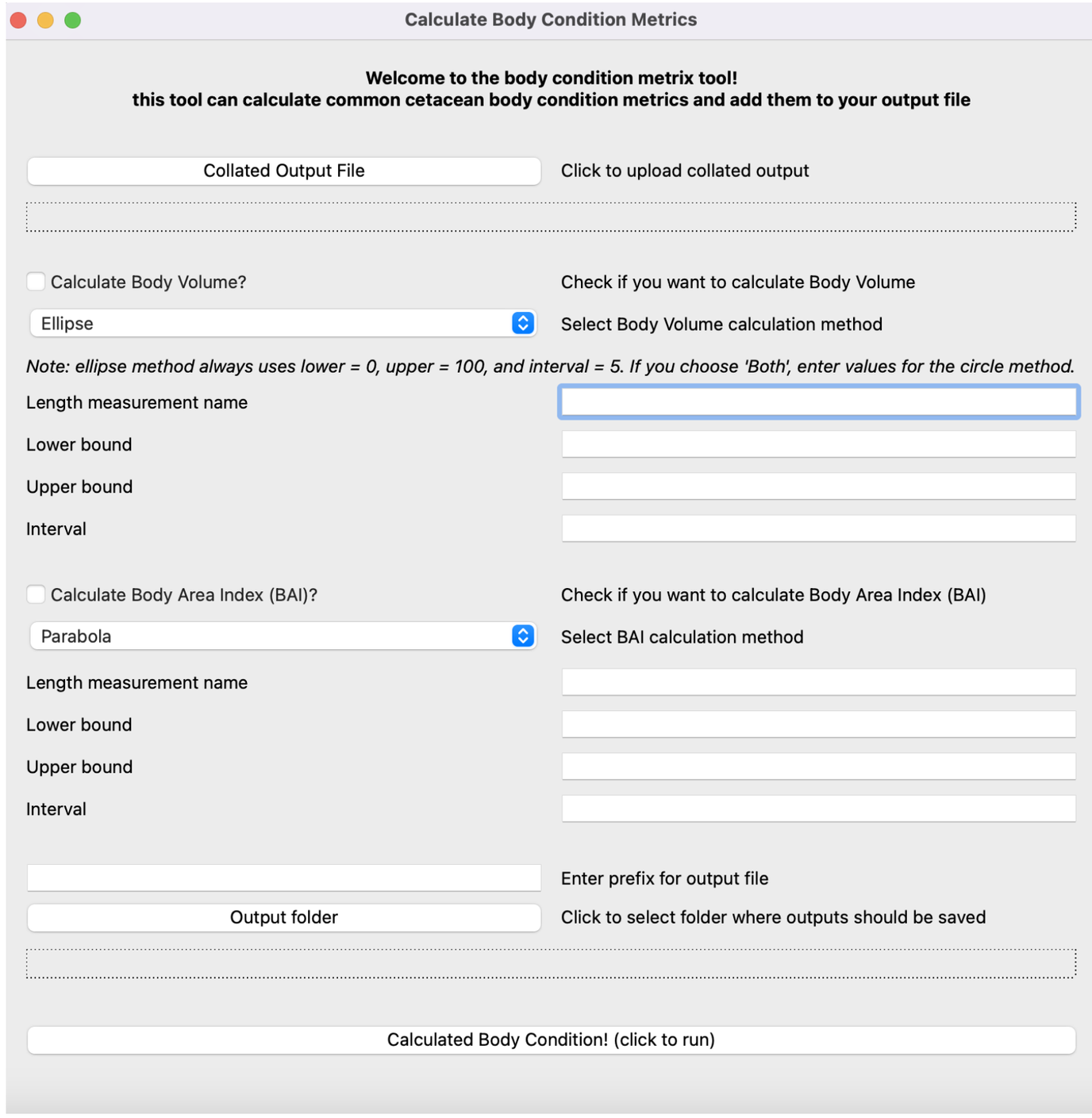
Collate MMX Outputs: Run it!

- Once you are all set with your inputs, you are ready to run!
- To run collatrix just click on Collate Data! (click to run)
- When done running, a message will appear underneath the run button.



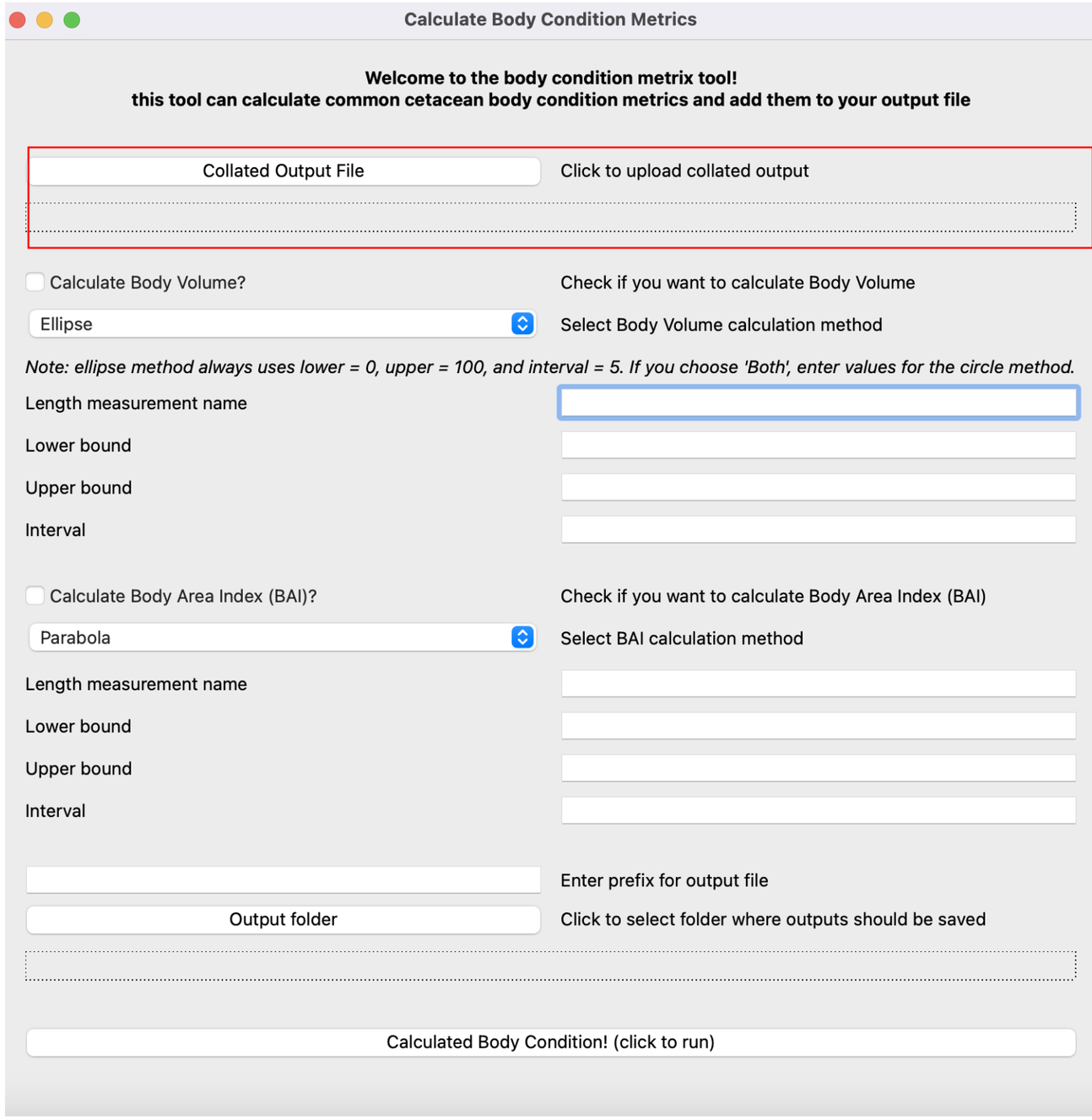
Calculate Body Condition

- This function can calculate a variety of cetacean body condition metrics.



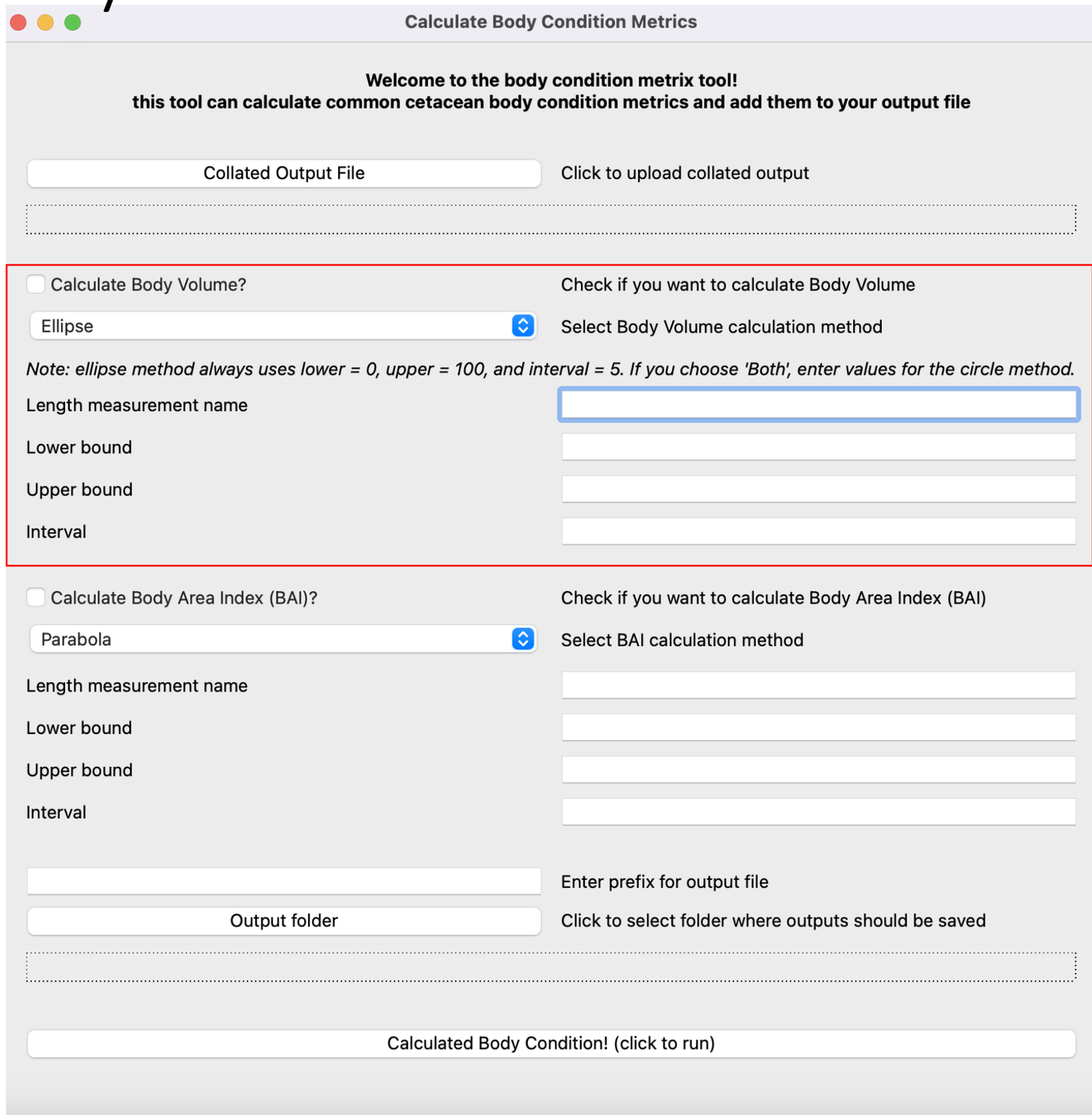
Calculate Body Condition: input file

- **CollatriX output csv**
  - Select the csv containing the collated measurements outputted by the collate MMX outputs function
- The path to the file you selected will be displayed in the box below the button



Calculate Body Condition: body volume

- CollatriX also provides the option to calculate body volume using either the circular or elliptical methods
  - Circular frustums: *Christiansen, F., Vivier, F., Charlton, C., Ward, R., Amerson, A., Burnell, S., & Bejder, L. Maternal body size and condition determine calf growth rates in southern right whales (2018). Maternal body size and condition determine calf growth rates in southern right whales. Marine Ecology Progress Series, 592, 267–281. http://doi.org/10.3354/meps12522*
  - Elliptical: *Christiansen F, Sironi M, Moore MJ, et al. Estimating body mass of free-living whales using aerial photogrammetry and 3D volumetrics. Methods Ecol Evol. 2019; 10: 2034–2044. https://doi.org/10.1111/2041-210X.13298*
- From the drop down, you can select either or both
- Regardless you will have to provide
  - The name of your length measurement (i.e. if you named total length "TL" enter "TL")
- The elliptical method always uses 0-100 in 5% increments
  - You have to have measured in 5% increments
- But for the circular method enter:
  - The lower bound percentage (i.e. if you want to use widths between 20-80% of total length to calculate body volume, then 20 would be the lower bound)
  - The upper bound (using the above example, 80 would be the upper bound)
  - The interval that the widths were measured in (i.e 5 if you measured in 5% increments. **Note** this value cannot be less than the increments of width that you measured).
- Please remember to cite the paper that published the calculation method in addition to this software.



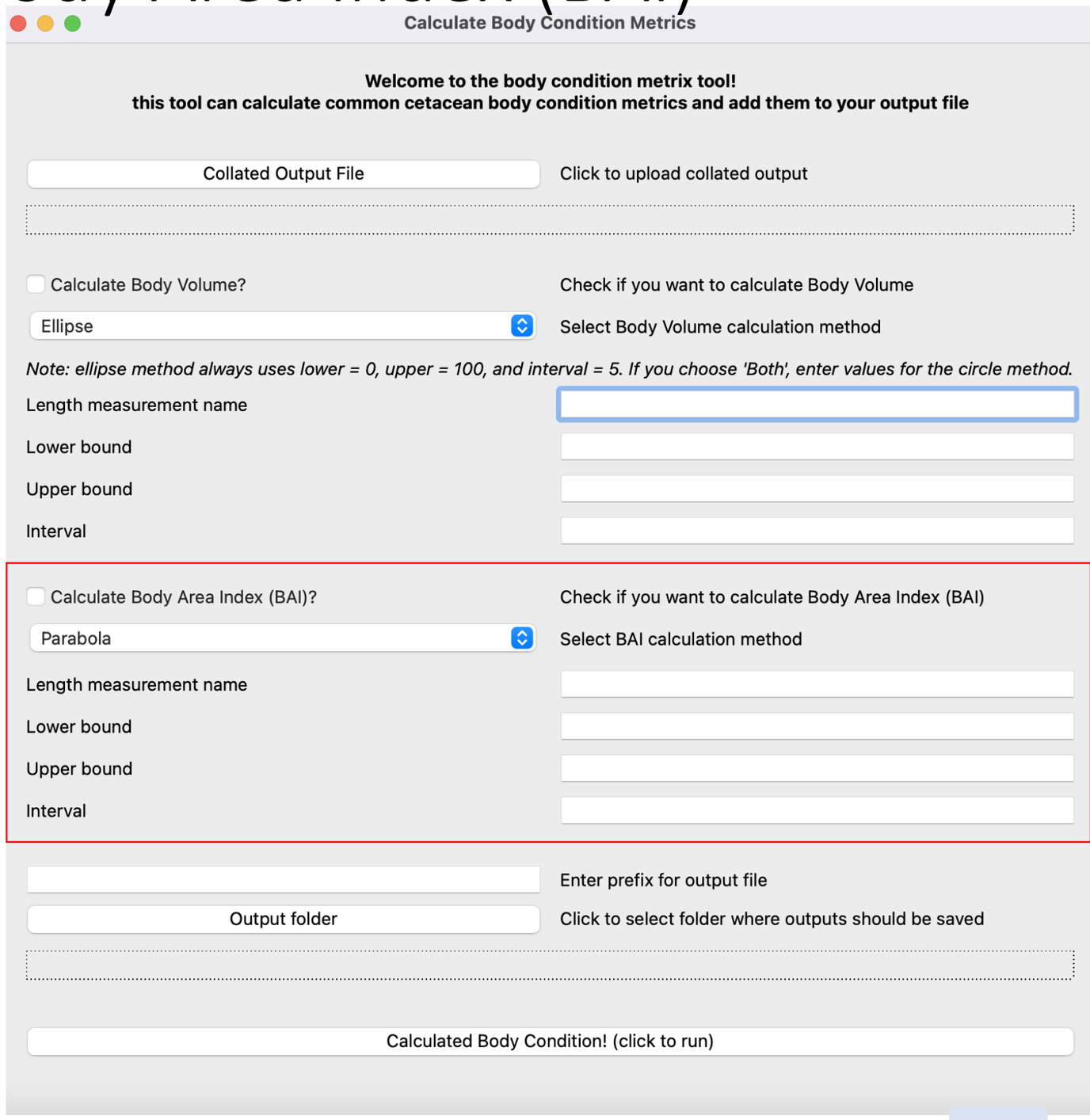
Calculate Body Condition: body volume ellipse notes

- The ellipse method works by assuming a ratio of whale body height to whale body width
  - Make sure you have thoroughly read this paper:
    Christiansen F, Sironi M, Moore MJ, et al. Estimating body mass of free-living whales using aerial photogrammetry and 3D volumetrics. Methods Ecol Evol. 2019; 10: 2034–2044. https://doi.org/10.1111/2041-210X.13298

- This means that you will have to manually add ratio columns for each width to your collated outputs before running the body condition tool.
  - You will need the following columns: [total length name]_ratio5.00 through [total length name]_ratio85.00
  - You can easily create the headers by copying the width headers ([total length name]_w5.00) and replacing the w with “ratio”, then fill those columns with the appropriate ratios per image
  - An example of these added columns is available in the demo folder.

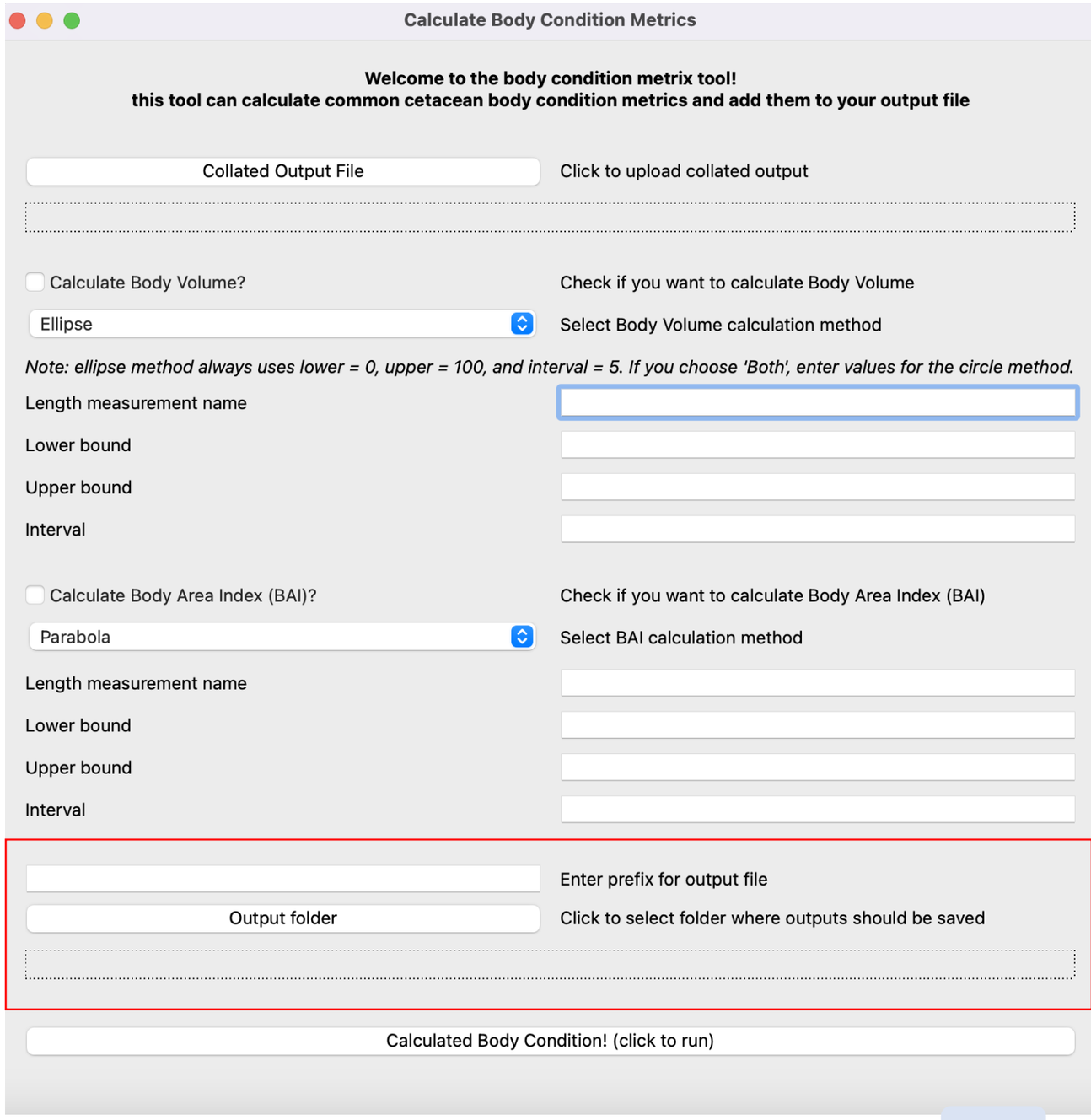
Calculate Body Condition: Body Area Index (BAI)

- CollatriX also provides the option to calculate BAI from perpendicular width intervals along a total length measurement following Burnett et al. 2018. If you say "yes" to have BAI calculated, the following information will need to be provided:
- The method used to calculate BAI. Options: parabola, trapezoid, or both.
- The parabola method will calculate a parabola for the sides of the whale using the width measurements and surface is calculated as the area under this curve (Burnett et al. 2018). The trapezoid method calculates the surface area by summing the surface areas of the trapezoids created between each segment (Christiansen et al. 2016). You can also select both to have both methods used.
- The name of your length measurement (i.e. if you named total length "TL" enter "TL")
- The lower bound percentage (i.e. if you want to use widths between 20-80% of total length to calculate body volume, then 20 would be the lower bound)
- The upper bound (using the above example, 80 would be the upper bound)
- The interval that the widths were measured in (i.e 5 if you measured in 5% increments. **Note** this value cannot be less than the increments of width that you measured).
- *Burnett, Jonathan D., Leila Lemos, Dawn Barlow, Michael G. Wing, Todd Chandler, and Leigh G. Torres. 2018. "Estimating Morphometric Attributes of Baleen Whales with Photogrammetry from Small UASs: A Case Study with Blue and Gray Whales." Marine Mammal Science 35 (1): 108–39. https://doi.org/10.1111/mms.12527.*
- If you calculate BAI please cite Burnett et al. 2018 in addition to this software.



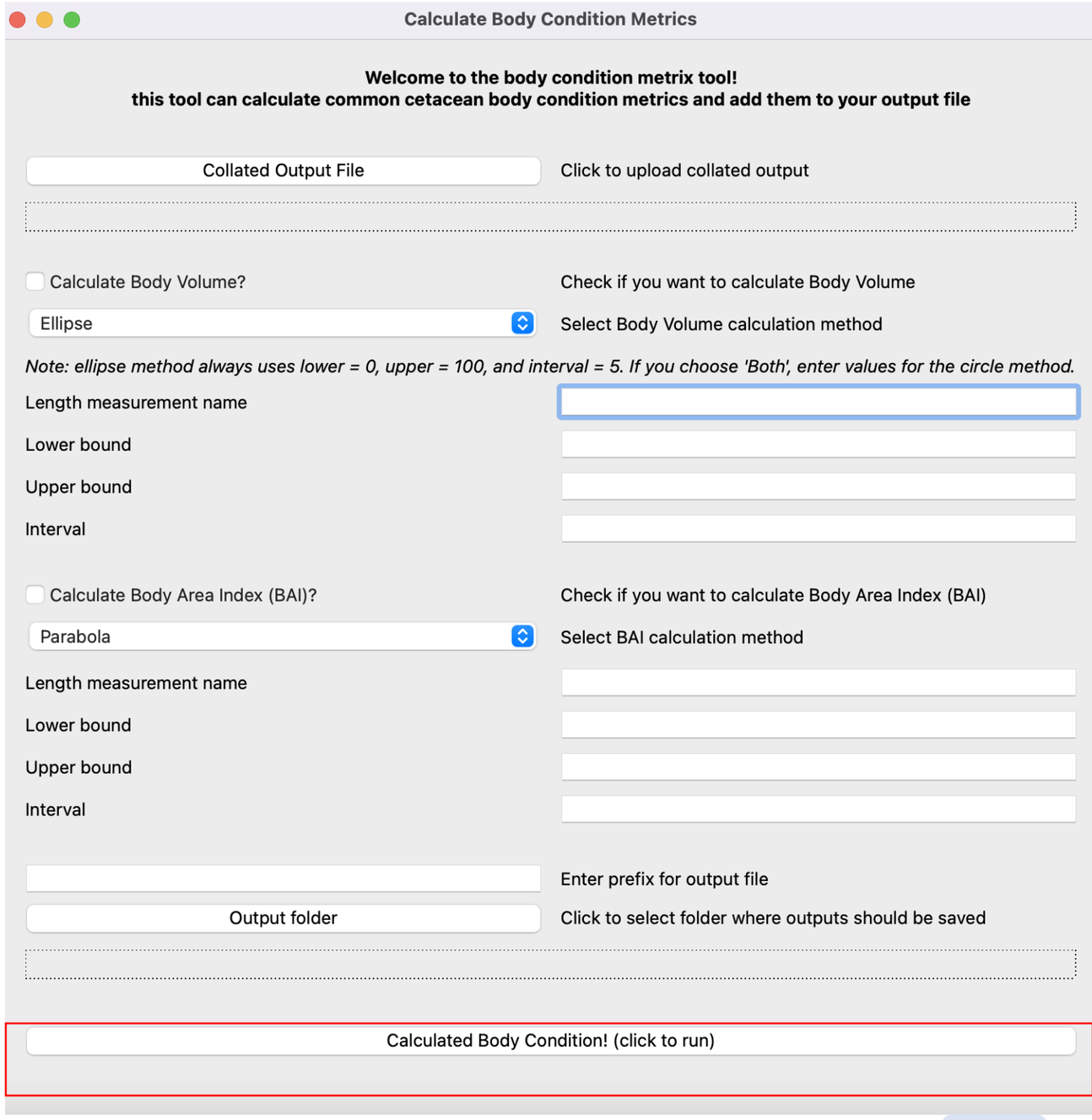
Calculate Body Condition: Output name and folder

- Lastly you need to enter a prefix that will be added to the output file name and the folder where you want it to be saved
- Prefix: The function will ask you what name you want for the output csv. The csv outputted by this function will be named inputname_bodycondition.csv.
- Folder: Select the folder where you want the file to be saved to. The path you selected will appear in the box below the button.
- The output of this function will be the collatrix output with added columns.



Calculate Body Condition: Run it!

- Once you are all set with your inputs, you are ready to run!
- To run collatrix just click on Calculate Body Condition! (click to run)
- When done running, a message will appear underneath the run button



Closing

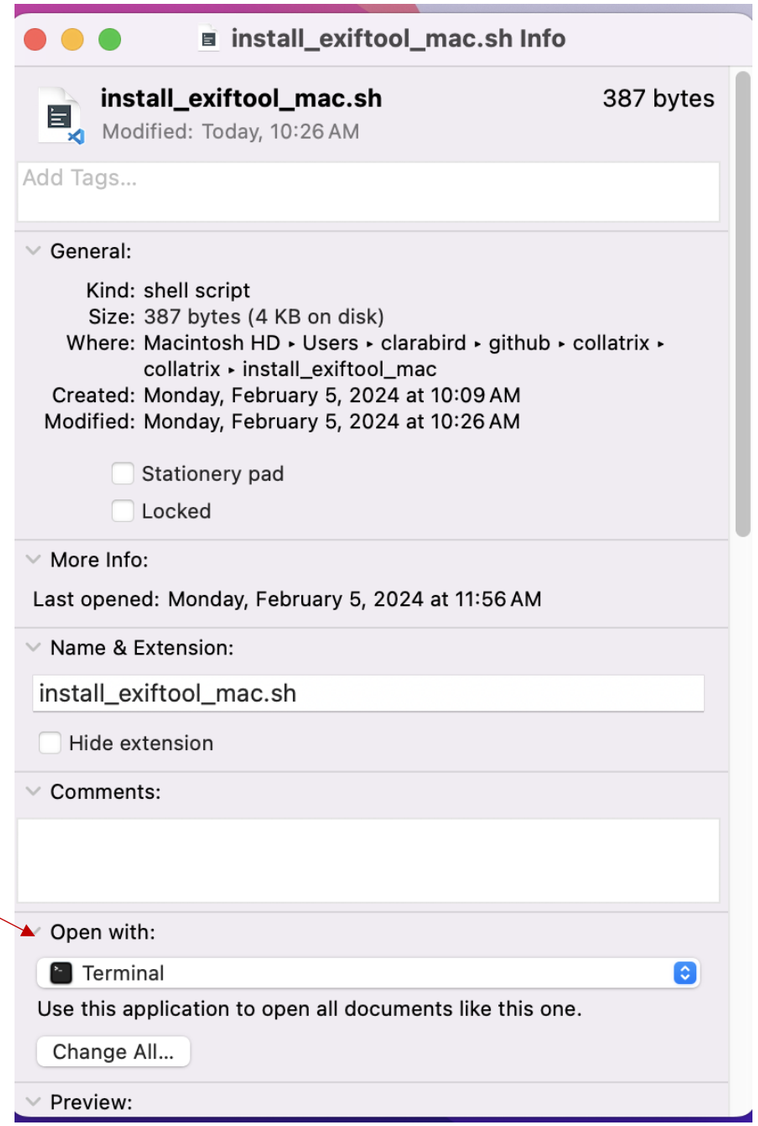
- To close, just close the windows.

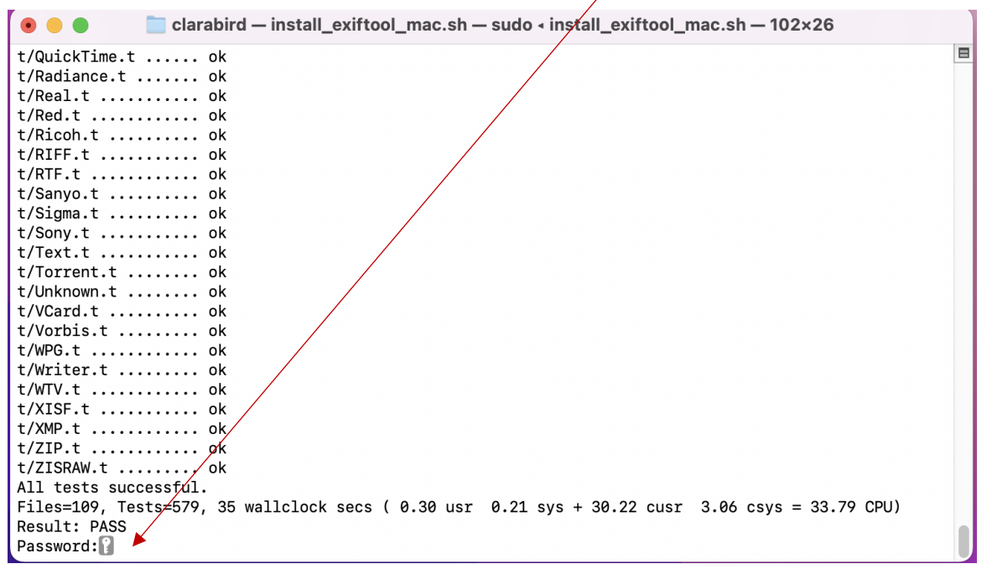
Crash Reporting

- If CollatriX crashes, a window should appear to save the crash report error code
- You can then open an “Issue” and upload the crash report on the CollatriX GitHub page https://github.com/MMI-CODEX/CollatriX/issues

Installing exiftool on mac

- You can download exiftool from the website here: https://exiftool.org/install.html, follow the instructions for your machine.
- You can also download the “install_exiftool_mac” zip file linked to the collatrix release (link here).
  - Unzip the folder
  - Inside the folder, double click on the install_exiftool_mac.sh
  - A terminal window should open and start running
    - If it doesn’t, right click on the .sh file and click on “Get Info”
    - Then change “Open with:” to Terminal
- At one point it will stop and ask you to enter your password, do so
- At the end it will ask you to hit Enter to exit. Do so, then you’re done and can close the terminal window.





Click here to go back “to start” slide

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