

## AeroNikon: Nikon aerial camera control

### Quick start guide

1 November 2019

#### **Background**

AeroNikon is an application designed specifically to assist Aviatrix clients who use Nikon DSLR cameras for their aerial survey operations. AeroNikon allows Aviatrix (the flight management software) to interact directly with the Nikon camera. This means that images can be written from the Nikon camera to the hard drive of the computer. The file names of the images are written directly to the meta data files, making it very easy to import the Nikon imagery into applications such as Pix4D and Photoscan. Importantly the software gives the user full control over the camera, so exposure settings (shutter speed, aperture, ISO etc.) can be easily changed.

#### **Compatibility and versions**

Since AeroNikon is very new (released October 2019), it is only compatible with the latest versions of Aviatrix and the AeroScientific triggering hardware. The version of Aviatrix that must be used should be dated 20<sup>th</sup> September 2019 or later. Earlier versions of Aviatrix will not work with AeroNikon.

The triggering hardware (either trigger box or FlightCube) must also be later versions. Please contact us to find out if your triggering hardware is compatible.

AeroNikon is compatible with the following Nikon DSLR cameras: D90, D700, D800/E, D810/A, D850.

AeroNikon is available in two versions: single camera and dual camera. The same installation file is used for both versions. The licence code which unlocks the software will determine which version is operational.

#### **Internal versus external GPS**

An important function of AeroNikon is the ability to create meta data files where the image names are logged with the GPS data at the time of acquisition, and written to a text file. Currently, this feature is only available if the internal AeroScientific GPS is used. (Both trigger boxes and FlightCubes have GPS receivers embedded.) If an external GPS is used, then image names cannot be written to meta data files with the GPS data.

Some Aviatrix users have hardware designed to work with the Vectornav VN200 GPS/IMU. In most cases this GPS is compatible with AeroNikon. If you are one of these users, please contact us to see if your hardware is compatible. If it is not, we can determine what is required to upgrade.

## Software installation

Both Aviatrix (20<sup>th</sup> September 2019 version or later) and AeroNikon (3<sup>rd</sup> October 2019 version or later) should be installed on the host computer (either the FlightCube or the user-supplied airborne computer).

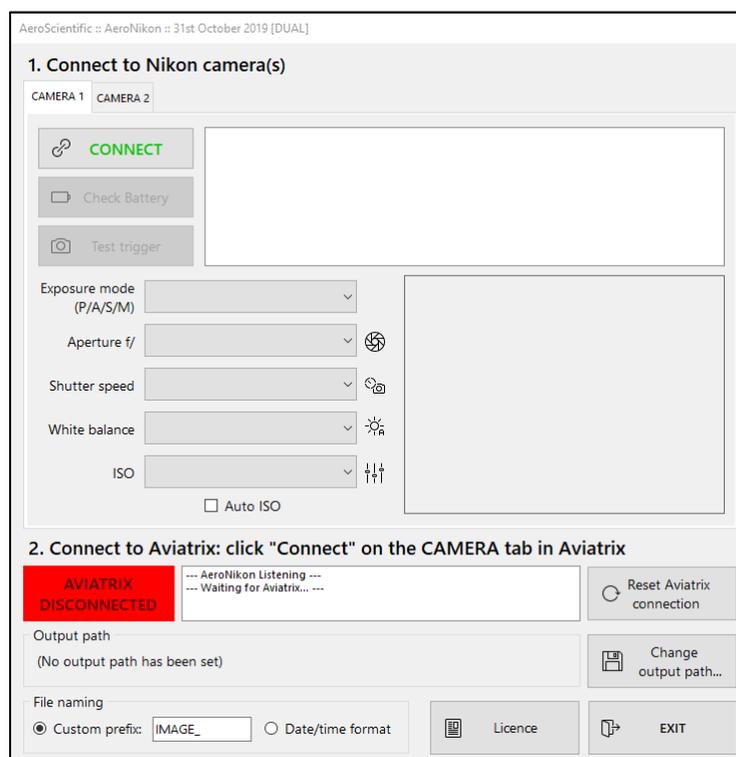
To install AeroNikon, double click the install executable (**AeroNikon\_Setup\_03OCT2019.exe**) and follow the instructions. After install, the software must be unlocked. This is done by emailing the 8-digit computer code to [info@aerosci.info](mailto:info@aerosci.info), on receipt of which you'll be sent an unlock code. This unlock code will determine whether the software is time-locked (will only run for a fixed period of time), and whether the software is for single or dual Nikon cameras.

## Hardware set up

The Nikon camera must be connected using the AeroScientific trigger/feedback cable and a USB cable. Note that for D800 series models, the USB cable must be USB3 and plugged into a USB3 port on the computer. Some USB3 cables are better than other; we recommend cables from Tether Tools ([www.tetherools.com](http://www.tetherools.com)).

## Starting AeroNikon

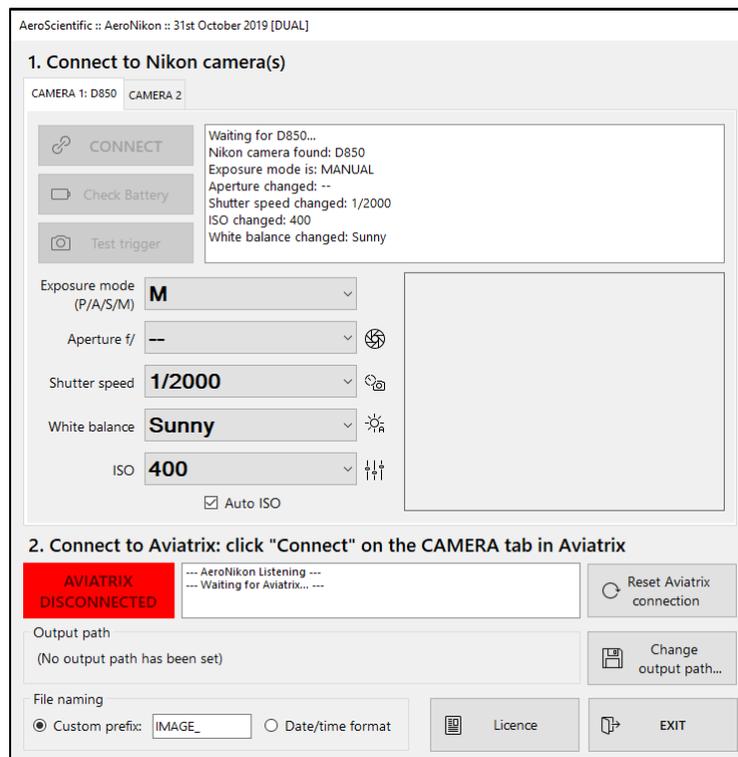
Both Aviatrix and AeroNikon must be running, but either one can be started first. On starting AeroNikon, the following window is displayed. (Note that this window is for dual cameras; the single camera version is almost identical; the only difference: the second camera tab is absent.)



The first step is to connect to the camera(s). Clicking the Connect button brings up the following window. Just click on the model of camera being used.

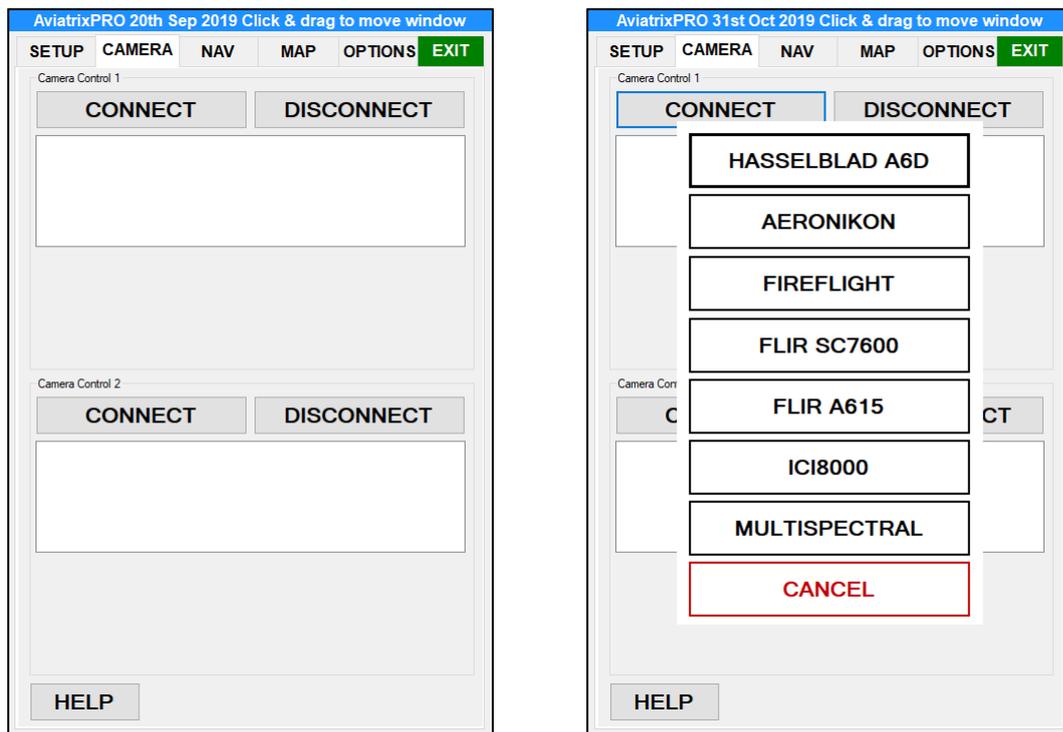


If two cameras are being controlled by AeroNikon, then the connection process needs to be repeated twice. Note that the two cameras do not have to be the same model; using different Nikon models is acceptable. When the camera has been connected, the AeroNikon window displays information from the camera.

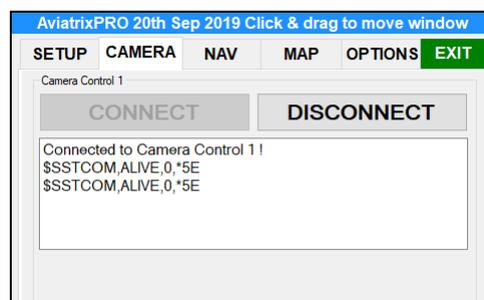


## Connecting to Aviatix

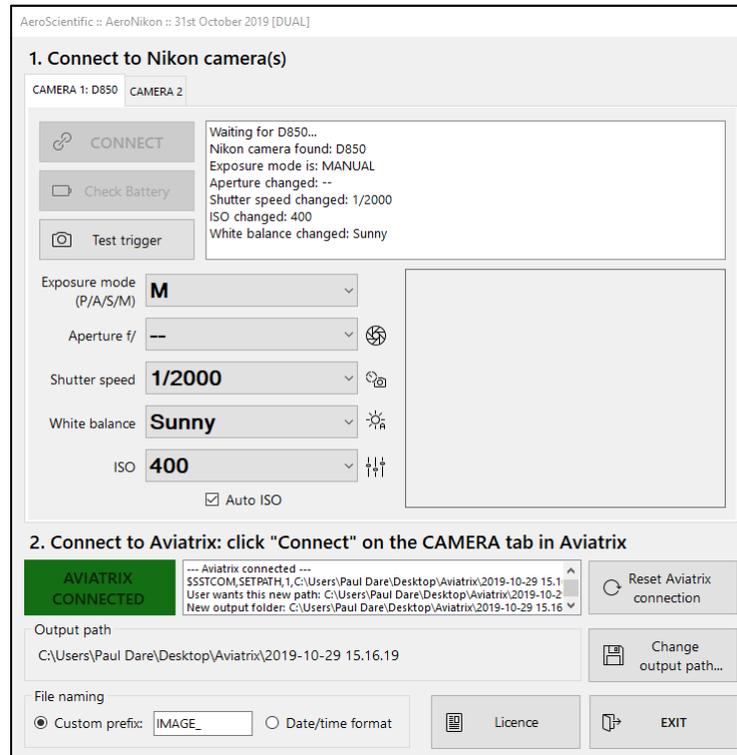
The AeroNikon software has to be “connected” to Aviatix so that the two software applications can talk to each other (which they do through internal communications). Connecting is done in Aviatix, on the CAMERA tab. Clicking CONNECT under “Camera Control 1” brings up a list of cameras that can be connected. To connect to AeroNikon, “AERONIKON” (obviously) should be selected. This need only be done once, even if two Nikon cameras are being controlled: Aviatix is connecting to the AeroNikon software, which in turn is connected to the two cameras.



Once connected, some of the messages between AeroNikon and Aviatix are displayed in the Aviatix Camera Control window.



On the AeroNikon window, the green indicator shows that both applications are connected. Additionally, some of the messages that go between Aviatrix and AeroNikon can be seen.



Once AeroNikon and Aviatrix are connected, the output folder for image storage for the cameras is automatically set. Images are stored in either CAMERA1 / CAMERA2 folders, which sit under the IMAGES folder, which in turn sits under the Aviatrix time/date folder. For example:

C:\Users\Paul\Desktop\Aviatrix\2019-10-29 15.16.19\IMAGES\CAMERA1

This folder can be changed using the "Change output path..." button. Note that when Aviatrix changes the output folder (such as when a new flight plan is selected), AeroNikon automatically changes the storage path for the images.

Finally, the image names can be changed. Either date/time format can be used, or a custom prefix (such as IMAGE\_XXX) where XXX is an incrementing number. If the custom prefix is used, this is automatically prepended by either CAM\_1 or CAM\_2, so that image file names from each camera are always different.

### Writing image file names to Aviatrix meta data

One of the important benefits of using AeroNikon is that image file names can be written into the Aviatrix meta data files. (Note that this will only work if the internal GPS is used, as discussed above.) When images are triggered by Aviatrix, the following files are created in the OTHER folder of the Aviatrix meta data:

NIKON\_D850\_SN\_8404890.TXT

IMAGE\_FILENAMES\_FROM\_AERONIKON.TXT

The first file is mostly used for debugging; it lists the image file names and the computer time at which they were acquired. Additionally, the name of the file matches the serial number of the camera.

The second file contains much more useful information, specifically the following fields:

- Image name
- Latitude
- Longitude
- Height
- Track
- Heading
- Pitch
- Roll
- GPS time
- Aviatrix feedback string

This file, with a little bit of formatting, can be directly imported into third party photogrammetry software, such as Photoscan or Pix4D.

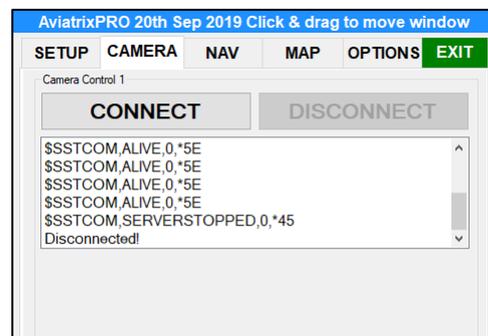
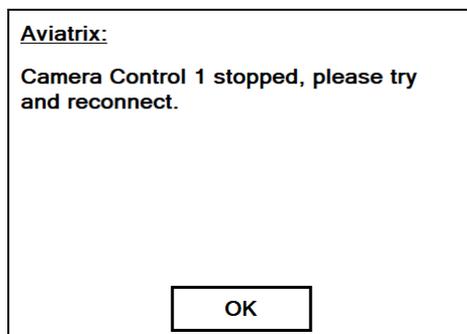
Note that if the “Test trigger” button on AeroNikon is used to fire the camera, or if the shutter release on the camera is physically pressed, the meta data described above will not be recorded. This meta data is only recorded when the camera is fired through Aviatrix.

## Image acquisition speeds

The speeds at which images can be acquired and written to the computer depends on many factors. With “normal” computer hardware (i7 processor, 16GB RAM, Samsung EVO850 SSD) our tests have shown that images can from a single Nikon D850 can be written to the computer at 2Hz (two frames per second). Other hardware configurations may give better or worse results. Even so, these bench tests are very impressive, and will almost certainly meet the requirements of most users.

## Troubleshooting the connection between Aviatrix and AeroNikon

Should the connection between Aviatrix and AeroNikon be lost (for example, if AeroNikon is closed), the following window and messages in Aviatrix are displayed.



By repeating the connection method described above, AeroNikon can be reconnected to Aviatrix. Other connection issues can potentially be solved by clicking the “Reset Aviatrix connection” button on the AeroNikon window. If all else fails, both applications should be closed and restarted.

### **Camera disconnection**

If the camera becomes disconnected from the computer (for example, if the camera is powered down, or the USB cable is unplugged), the AeroNikon software will notify the user in the message box (“Nikon camera removed”). When the camera is reconnected to the computer, AeroNikon will automatically reconnect to the camera.

Note that Aviatrix will not notify the user of the camera disconnection. This is because Aviatrix is connected to AeroNikon, and not directly to the cameras. Aviatrix will only notify the user if it becomes disconnected from AeroNikon.

### **Known issues**

AeroNikon is a very new software application, and although it has been tested thoroughly, there is a small chance that some minor bugs might still be present. It’s possible that we haven’t tested all of the edge cases.

Problems can occur with software like AeroNikon when the system is pushed too hard (for example, trying to capture more than two frames per second). Behaviour of all AeroScientific software is unknown when it is used outside its design envelop.

Additionally, problems may occur if the cameras are disconnected during the acquisition. It is important to ensure that all the hardware remains connected all the time.

### **Further information**

If you require further information about AeroNikon, or would like to give us some feedback, please contact us at [info@aerosci.info](mailto:info@aerosci.info).