



CHCNAV AlphaAir 10

User Manual



Aerial Surveying | August 2023

Make your work more efficient





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1 Reading Tips

1.1 Symbol Description

-  **Forbid**
-  **Warning**
-  **Important note**
-  **Operate & Using tips**

1.2 Recommendations

CHCNAV provides below documents for users:

- AA10 Lidar system user manual
- AA10 Configuration list

It is recommended for users to read above documents before first time using.

If users have any questions regarding the content of this manual, please contact us at +86 21 542 60 273 for professional consultation and assistance.

1.3 Service & Support

CHCNAV website: www.chcnav.com

Email: sales@chcnav.com | support@chcnav.com

Tel: +86 21 542 60 273 | Fax: +86 21 649 50 963

CHCNAV reserves the right to modify product status and user manuals without prior notice.

For the latest product information, please visit CHCNAV's official website (www.chcnav.com).

1.4 Disclaimer

- The customer should use and maintain the equipment in accordance with the requirements of the manual. If the service life of equipment is affected due to improper use or maintenance, even broken, CHCNAV will not bear the relevant responsibility. All repairs and maintenance services resulting from this will be charged at standard prices.
- During transportation, if the equipment is damaged due to improper logistics operation, CHCNAV will not bear the relevant responsibility.
- During equipment use, if a customer disassembles and assembles the equipment without CHCNAV's suggestions & permission, and resulting in damage, CHCNAV will not bear the

relevant responsibility.

- Customer should use default batteries and accessories. The use of non-original accessories is not eligible for warranty; if occur accident, the manufacturer will not bear the corresponding responsibility.
- The M300 drone and Skyport interface mentioned in the appendix are products of DJI Innovations Co., Ltd., based in Shenzhen, China.

2 Using Requirements

2.1 Using Environment

- It is not recommended to use in rainy, snowy, or foggy weather for safety. Also, the point cloud data will have more noise.
- It is not recommended to frequently use it in dusty environments, which will affect the service life of equipment.
- It is forbidden to expose the device and accessories under extreme temperature. The environmental temperature must not be lower or higher than the specification temperature.
- When the equipment is transferred from a cold environment to a warm environment, water may condense on certain components inside the scanner. To avoid this, it is recommended to place the scanner in a sealed plastic bag before transferring. When the condensate is evaporated, then turn on the plastic bag.

2.2 Tips Before Using

- Check whether the laser glass is normal, if there is dust exists, please use the cleaning kit to clean it.
- Check whether the ports are clean, and whether the pins are normal.
- Check whether the connecting cables are reliable and stable, and whether the GPS cable is stable and normal.
- Check whether the remote control has sufficient power.

2.3 Tips During Using

- When using, make sure that all cables and ports are connected correctly.
- After powered on, check whether the connection between remote controller and equipment is normal, and whether the status of tracking satellite and board is normal.
- Place equipment in an open sky area with good GPS signal during powered on.
- If the buzzer sounds abnormally during the capture process, please check immediately whether the equipment status is normal.
- Before starting work, check the remaining capacity of the data memory card. If the remaining capacity is less than 10% or does not meet the current collection capacity requirements, the old data file needs to be deleted in advance.
- Before starting work, please check whether the controller's laser parameter settings are correct. If not correct, please reset it again according to the project requirements.

2.4 Tips After Using

- After using, unplug the cable first, then place the equipment into equipment case and accessories into accessory case.
- During transportation, take care of the equipment and try to avoid bump.

3 Product Description

AlphaAir 10 is an advanced aerial surveying solution that seamlessly integrates LiDAR and RGB sensors to meet the needs of professional UAV LiDAR mapping and drone photogrammetry. Leveraging CHCNAV's cutting-edge LiDAR technology, the AA10 flawlessly integrates high-precision LiDAR, accurate GNSS positioning, IMU orientation and an industrial-grade full-frame orthophoto camera. Combined with CHCNAV point cloud and image fusion modeling software, the AA10 provides a survey-grade, efficient and cost-effective approach to 3D data acquisition and processing. The AA10 Airborne LiDAR + RGB System accelerates accurate 3D data collection within a single mission and simplifies the process of capturing 3D reality through a streamlined workflow.



3.1 Check List

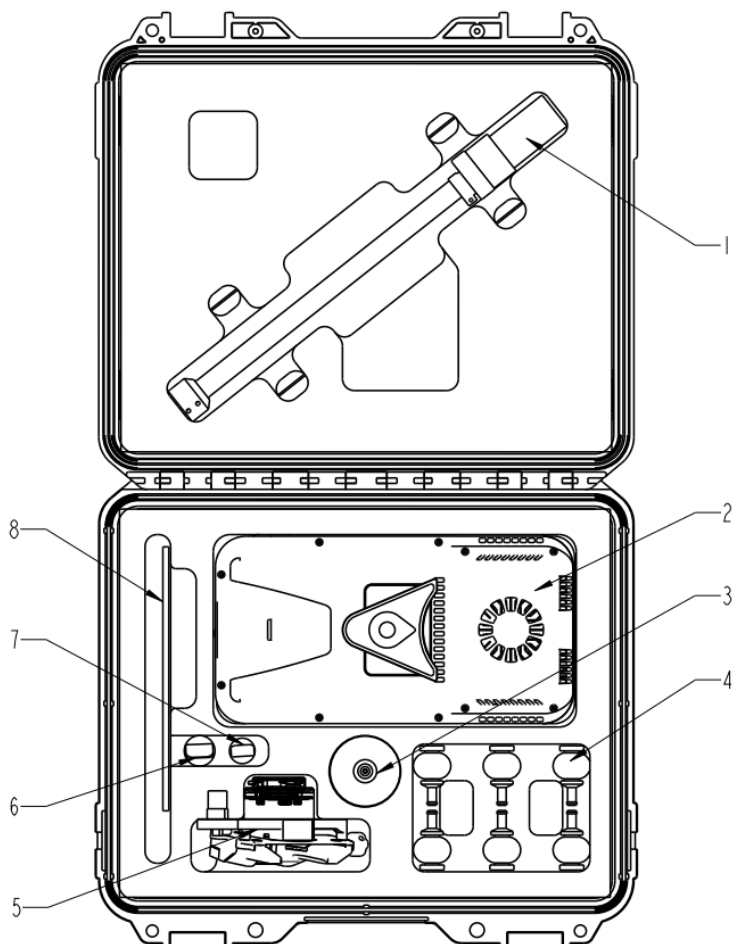
Note: Please refer to the actual delivery list.

AA10 LiDAR system configuration list is shown below:

N	Description	Model	Pcs
1	AA10 unit	AA10	1
2	AA10 transport container		1
3	USB3.0 to TYPE-C adapter cable		1
4	USB disk (32G)		1
5	Lens cleaning wipes		10
6	Lens cleaning air blow		1
7	CoPre standard product package (incl. USB dongles, etc.)	CoPre	1
8	Mount platform for M300		1

3.2 Delivery of Equipment and Materials

Note: Please refer to the actual delivery list.



- | | |
|---|----------------------------|
| 1. GNSS antenna; | 5. Mount adapter; |
| 2. AlphaAir 10 LiDAR system; | 6. CoPre2 software dongle; |
| 3. Cleaning ball; | 7. USB disk; |
| 4. Shock absorbing balls (for M300 & M350); | 8. User manual. |

- AlphaAir 10 LiDAR system:



- AlphaAir 10 transport container:



- Mount adapter & GNSS antenna:



- USB disk & CoPre2 software dongle:



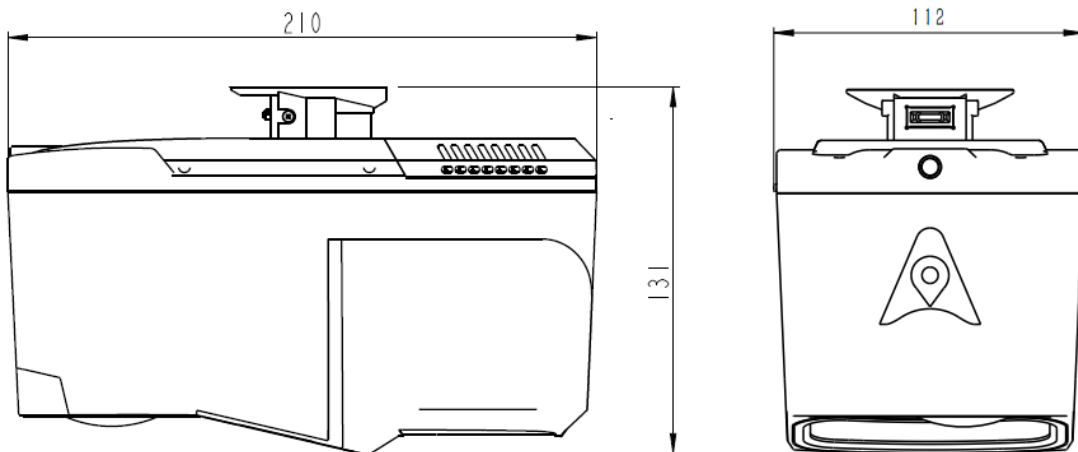
- Lens cleaning air blow & Lens cleaning wipes:



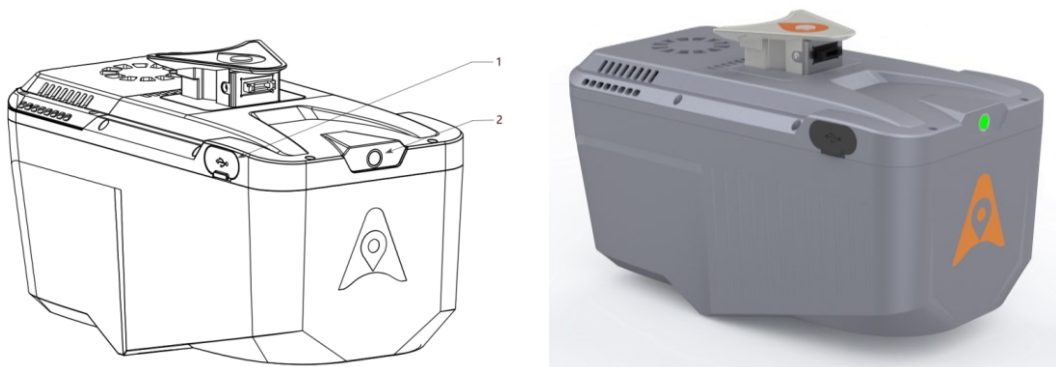
3.3 Physical Characteristics

3.3.1 Weight and Size

- Weight: 1.55kg.
- Length, width, and height (210×112×131mm) are shown below:



3.3.2 Interface Definition



1. Type-C port for data copy (without turn on).
2. LED indicator for device status.

LED indicator & buzzer	Device status
LED Indicator off	Power off
Quickly blink (5 times per second)	Under initialization
Solid green	Initialize successfully
Slowly blink (2 times per second)	Create project successfully; GNSS & IMU data collecting...
Normal blink (1 time per 2 second)	Data capturing...
Abnormal blink with sound	Abnormal

3.4 Power Supply and Physical Characteristics

Power consumption	40W
Working temperature	-20 °C to +50 °C
Storage temperature	-20 °C to +60 °C

3.5 AA10 Technical Data

3.5.1 Laser Product Classification

Class 1 Laser Product according to IEC 60825-1:2014



3.5.2 Max. Measuring Range

Laser Pulse Repetition Rate PRR	100kHz	300kHz	500kHz
Max. range, @ $\rho >10\%$	283m	194m	152m
Max. range, @ $\rho >20\%$	400m	275m	215m
Max. range, @ $\rho >80\%$	800m	480m	280m

NOTE:

- Rounded values.
- Flat terrain assumed.
- Typical values for average conditions. Maximum range is specified for flat targets with size more than the laser beam diameter, perpendicular angle of incidence.

3.5.3 Max.Operating Flight Altitude AGL

Flat terrain assumed, scan angle $\pm 75^\circ$ FOV

Laser Pulse Repetition Rate PRR	100kHz	300kHz	500kHz
@ $\rho >10\%$	224m	154m	121m
@ $\rho >20\%$	317m	218m	170m
@ $\rho >40\%$	449m	308m	222m
@ $\rho >60\%$	549m	378m	222m
@ $\rho >80\%$	634m	381m	222m

NOTE:

- Rounded values.
- Flat terrain assumed.
- Different target reflectance has different max. operating flight altitude AGL.

(1) When the mission area consists of post-rain scenes or mainly targets asphalt materials, which have low reflectance, it is recommended to set the flight altitude with a reflectance $\rho >10\%$.

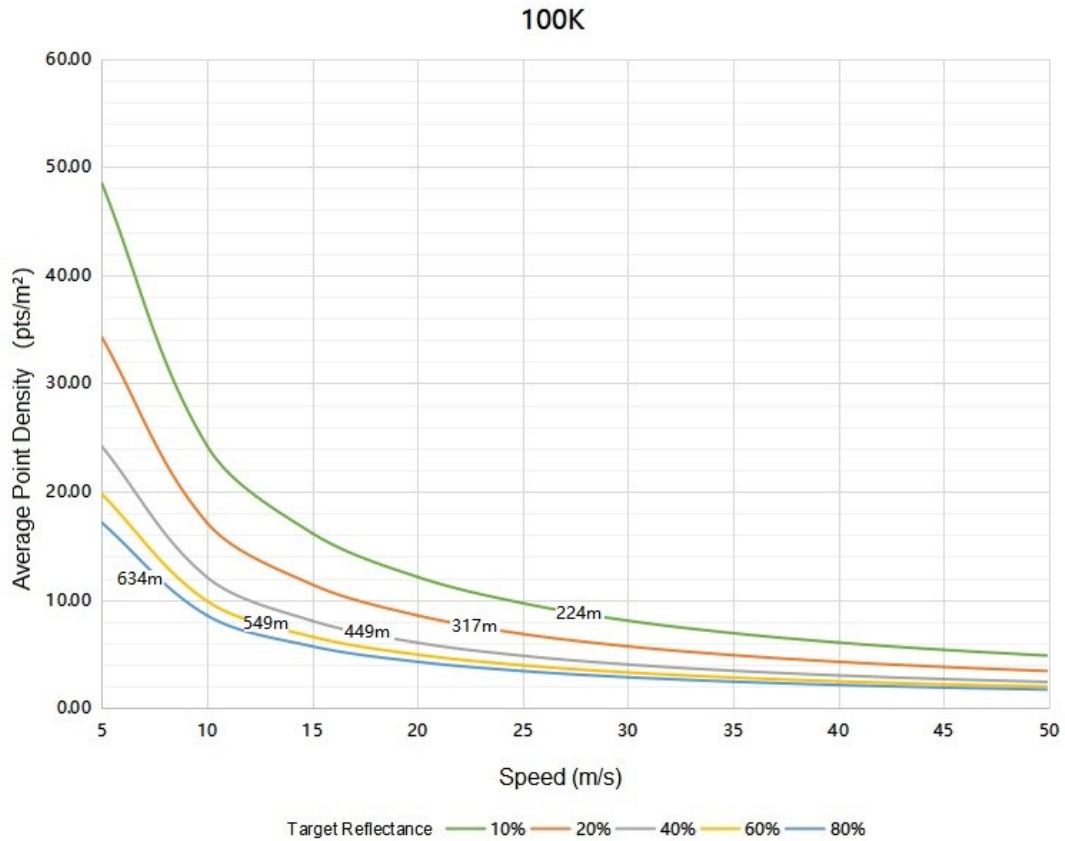
(2) When the mission area mainly composed of materials like deserts, limestone, etc., it is recommended to set the flight altitude with a reflectance $\rho >40\%$.

(3) For other general mission area, it is recommended to set the flight altitude with a reflectance $\rho >20\%$.

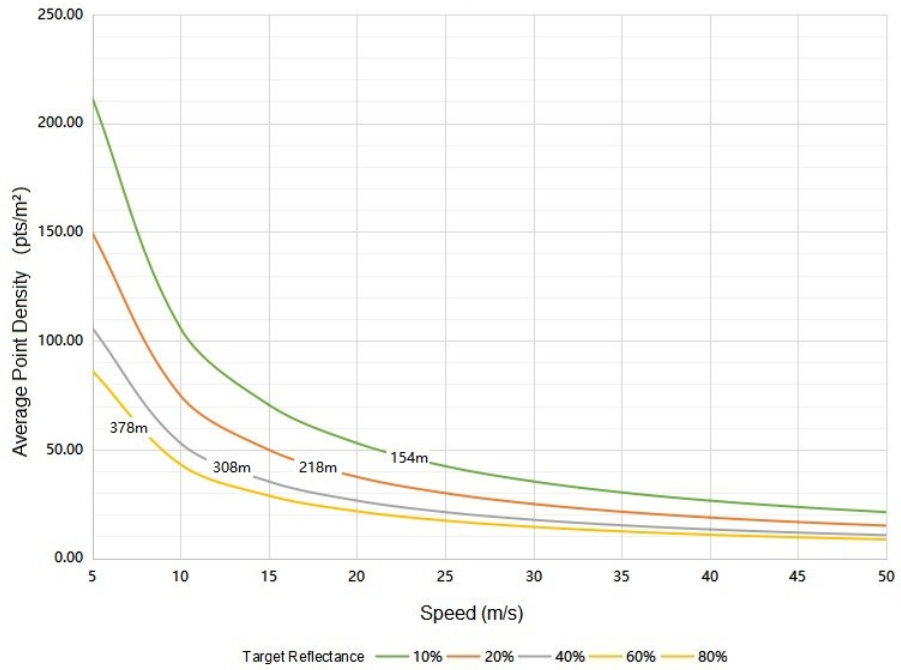
3.5.4 Max.Operating Flight Altitude AGL & Point Density

The graph below shows the maximum operating flight altitude AGL at different Laser Pulse Repetition Rate PRR under different target reflectance.

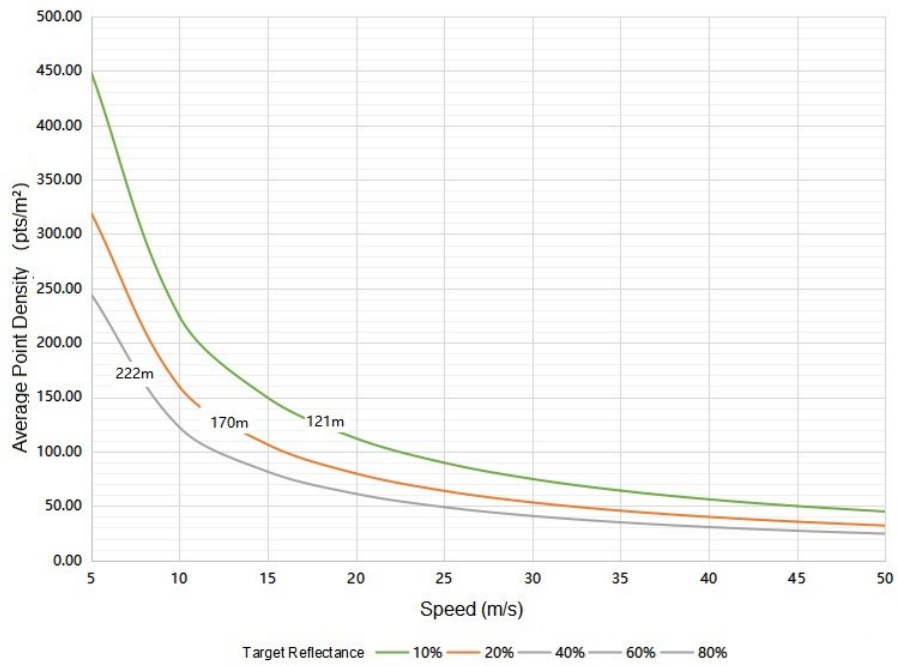
The graph below also shows the relationship between the average point density within a single strip and the flight speed.



300k



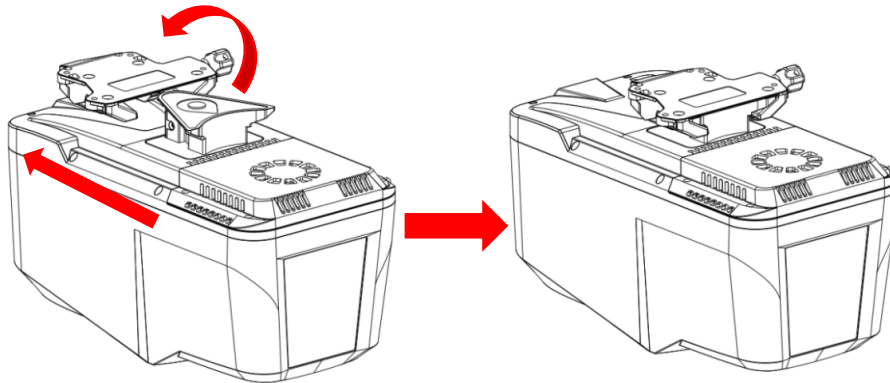
500k



4 Installation And Disassembly Guide

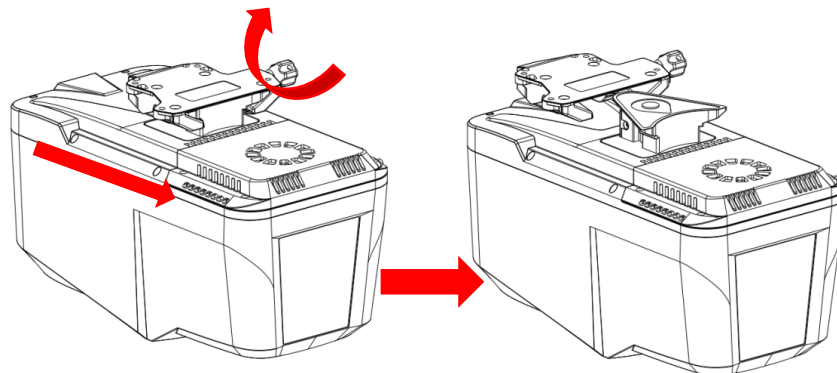
4.1 Installation Steps

- Push the “Alphaport” slider of scanner into the quick-release clamp which on the bottom of the airborne mounting platform in the direction of the arrow until hear a “click” sound.
- Tighten the side screw bolts to make it stable and finally finished the installation.



4.2 Disassembly Steps

- When removing the AA10 from the platform, hold the bottom of device with left hand, loosen the side screw bolts counterclockwise with right hand until the threaded part of the side screw bolts disengages.
- Pull the side screw bolts back to the maximum position with the right hand and keep it. Pull the “Alphaport” slider of scanner out the quick-release clamp which is on the bottom of the airborne mounting platform in the direction of the arrow.



5 Product Using

5.1 Advance Preparation

- Check the equipment to ensure that the contents and other accessories are not missing.
- Check whether there are any stains on the laser beam exit window and camera lens. If there are stains, use the cleaning tools provided with the package to gently wipe and clean them.
- Make sure the batteries of base station, aircraft, and remote control are fully charged.
- Check the device authorization and storage space.
- Confirm whether there are tall buildings or interference sources near the take-off point.

5.2 Equipment Installation


Take out the equipment from the container before using. Install it on the corresponding platform and connect all cables.

- First, install the equipment on the platform and lock it with screws. For detailed information, refer to Chapter 4.
- Connect both power supply cable and GPS feeder cable of equipment.

5.3 LiDAR Power On


Set up the base station at an open sky area, frequency set as 1Hz. Turn on the equipment after the base station starts recording static data. During capture, one person controls the flight, and the other person operates the remote control.

- After the device installation is completed, turn on the drone's power. The AA10 will power on automatically.
- Wait for about ten seconds, and the device's indicator light will start flashing, which means the system has powered on successfully and starts initialize.
- Use phone or tablet to search for the WIFI of AA10 and connect to the device. For detailed information, refer to Chapter 6.
- After powering on the AA10, wait around 1 minute until the device indicator light becomes steady on, indicating that the device initialization is complete.

 **Note: The correct procedure is to install the AA10 first and then power on the aircraft. The AA10 does not have an on/off switch; the AA10 will automatically power on when the aircraft is powered on. So, please make sure to install the AA10 before powering on the aircraft.**

5.4 LiDAR Power Off

- Before powering off equipment, please make sure the project is already stopped.
- Turn off the power supply system to power off the equipment.

 **AA10 has no “ON/OFF” button, which will be powered off automatically after the power supply turned off.**

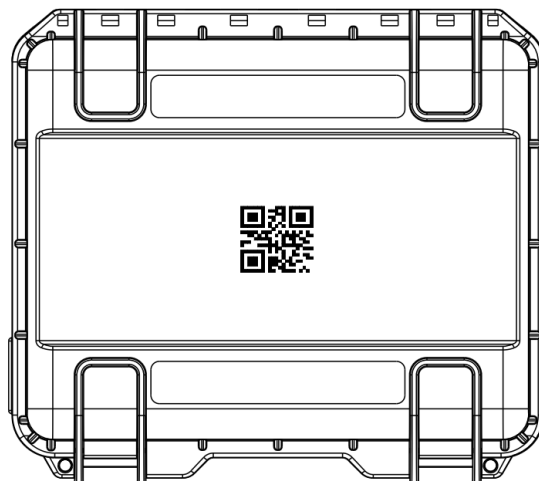
6 Product Workflow


AlphaAir 10 use webpage to configure settings and control. The webpage can be accessed from any computer, tablet, or mobile browser.

6.1 AA10 Connection


After AA10 installation is completed, turn on the drone's power. The AA10 will power on automatically, wait for about ten seconds, and the device's indicator light will start flashing, which means the system has powered on successfully and start initialization.

AA10 Wi-Fi will be available which is named "AA10-xxxxx" (where "xxxxx" represents the last five digits of the device's serial number). Once connected to the device, scan the QR code located in the middle of the AA10 device box (see the figure below). It will login to the control web page of AA10. Users can also enter the web address "192.168.0.100" in mobile phone's browser to access the control interface of AA10.




 **Note:** When connecting to the device using the mobile phone's Wi-Fi function, if the webpage not allowed to access, it may need to disable mobile 4G or 5G data.

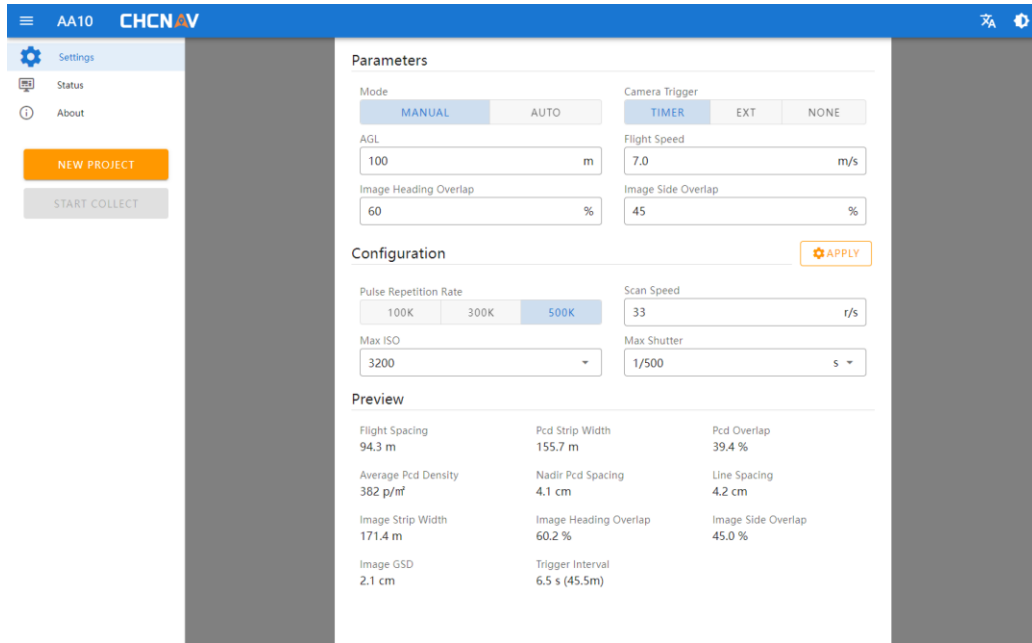
After powering on the AA10, wait around 1 minute until the device indicator light becomes solid green, which means the device initialization is complete.

 **Note:** The correct procedure is to install the AA10 first and then power on the aircraft. The AA10 does not have an on/off switch; the AA10 will automatically power on when the aircraft is powered on. So, please make sure to install the AA10 before powering on the aircraft.

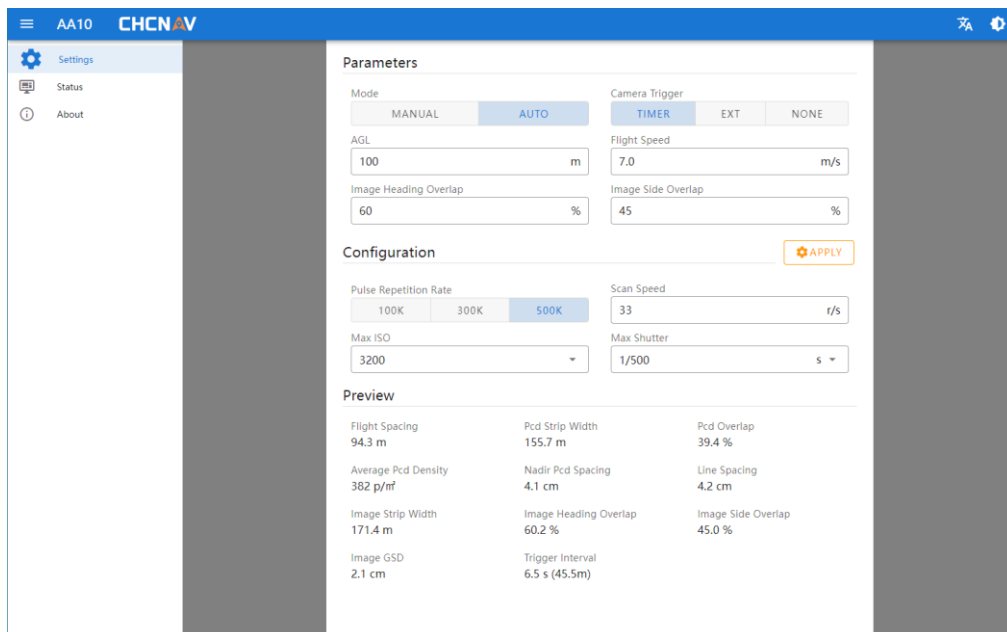
6.2 AA10 Webpage Configuration

 Please refer to the actual software interface.

The webpage interface is displayed as follows:



Manual mode interface



Auto mode interface

The operation mode of AA10 has two options: Manual mode and Auto mode. Users can switch between "manual" and "auto" modes in the software interface.

6.2.1 Manual Mode

Default setting is manual operation mode, and the specific workflow is as follows:

1. Configure the "Camera Trigger" option first. There are three camera trigger modes: TIMER, EXT and NONE. The default operation mode is "TIMER".

- Timer: Camera takes pictures by time interval. The minimum interval is 1s.
- Trigger param (s) = (1-camera heading overlap) * GSD (m) * 5460/flight speed (m/s).
- GSD (m) = AGL (m) * pixel size (mm) / focal length (mm).
- External: Camera take pictures by external signal trigger.
- Disabled: Camera will not take pictures.

Parameters

Mode

MANUAL

AUTO

Camera Trigger

TIMER

EXT

NONE

2. When the camera is enabled, the user need input AGL, flight speed, image heading overlap and side overlap depend on project conditions and data requirement. When the camera is disabled, user only need input AGL and flight speed.

3. After the parameter settings are completed, in the "Configuration" section, the software automatically calculates and sets the recommend pulse repetition rate and scan speed based on input parameters such as AGL and flight speed.

4. After click "Apply", the settings of pulse repetition rate and scan speed are implemented successfully.

AGL

m

Flight Speed

m/s

Image Heading Overlap

%

Image Side Overlap

%

Configuration ⚙️ APPLY

Pulse Repetition Rate

100K

300K

500K

Scan Speed

r/s

Note: When there is strong wind, the flight attitude of the drone may become unstable, resulting in different laser scanning lines strip. In this case, the user can manually adjust the scan speed to a value higher than the recommended value to achieve a more uniform point cloud. Users can also modify the pulse repetition rate and scan speed according to the specific conditions of the project (The scan speed can be set within the range of 10-50 r/s).

5. When the camera is enabled, set "Max ISO" and "Max Shutter" in "Configuration" section. ISO and shutter speed will automatically adjust within their set maximum range based on the brightness of the light.

Configuration ⚙️ APPLY

Pulse Repetition Rate

100K

300K

500K

Scan Speed

33
r/s

Max ISO

3200
▼

Max Shutter

1/500
s ▼

Note: Mounting on rotor-wing UAV: set "Max ISO" to 3200 and "Max Shutter" to 1/500;

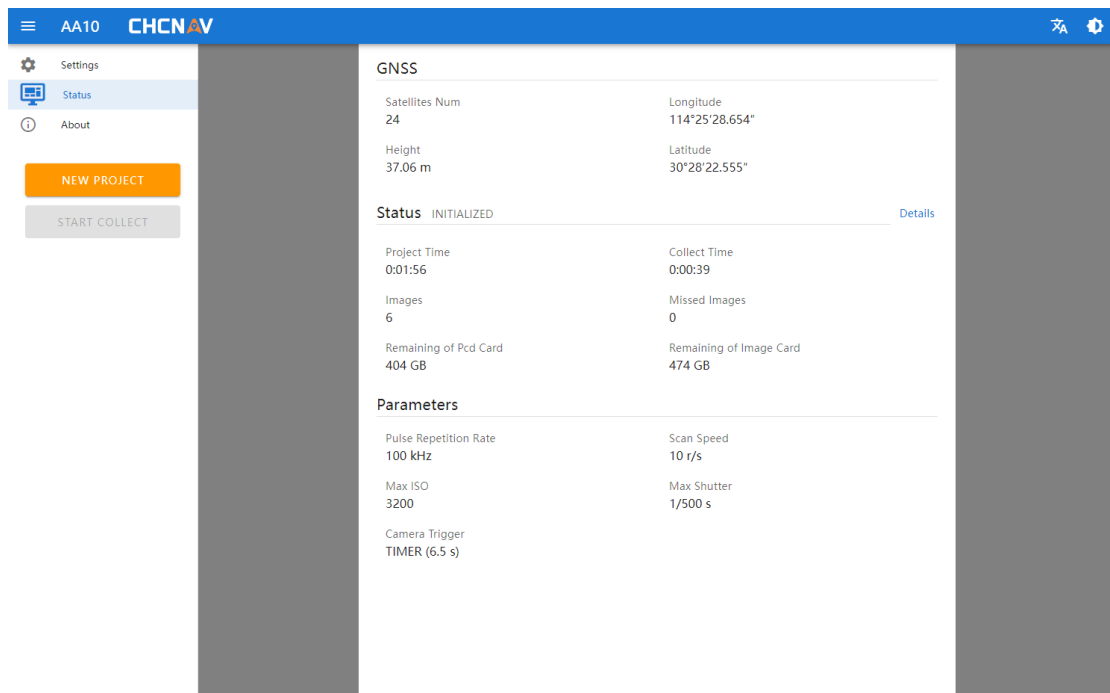
Mounting on Fixed-wing UAV: set "Max ISO" to 3200 and "Max Shutter" to 1/1000;

6. After configuring the relevant parameters, in the "Preview" section, you can view the following details:

Preview

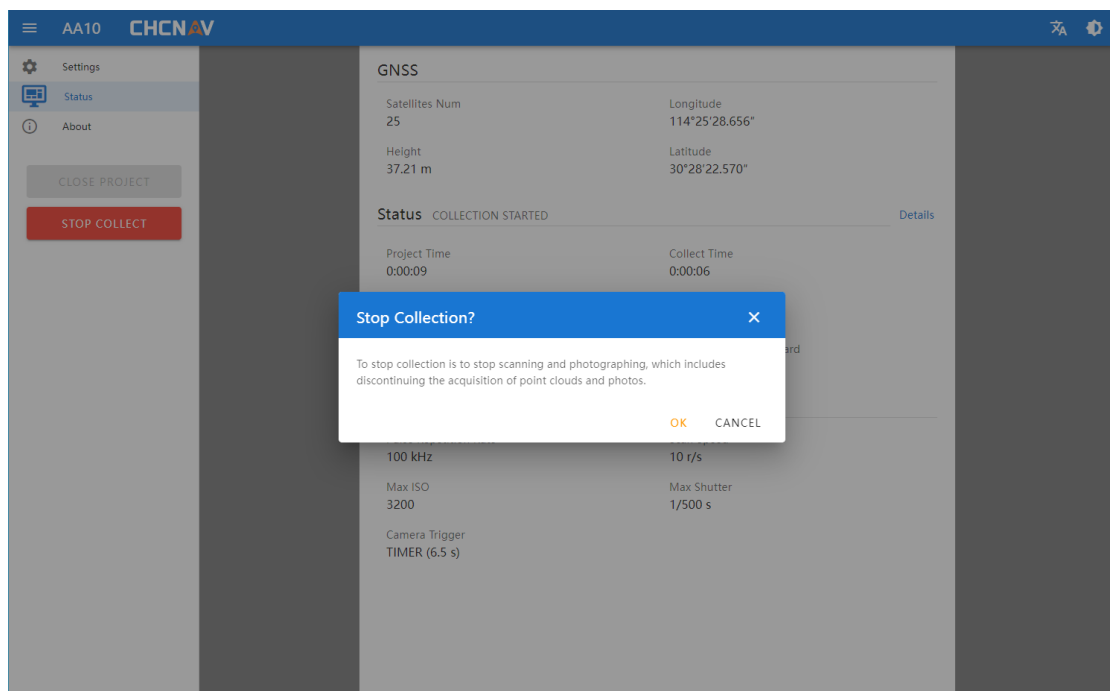
Flight Spacing	Pcd Strip Width	Pcd Overlap
94.3 m	155.7 m	39.4 %
Average Pcd Density	Nadir Pcd Spacing	Line Spacing
382 p/m ²	4.1 cm	4.2 cm
Image Strip Width	Image Heading Overlap	Image Side Overlap
171.4 m	60.2 %	45.0 %
Image GSD	Trigger Interval	
2.1 cm	6.5 s (45.5m)	

7. Once the parameter settings are completed, click on "New Project", the indicator light on the device will change from a solid green to slowly blink for IMU static alignment. Keep the static time at least 3 minutes for slowly blink.

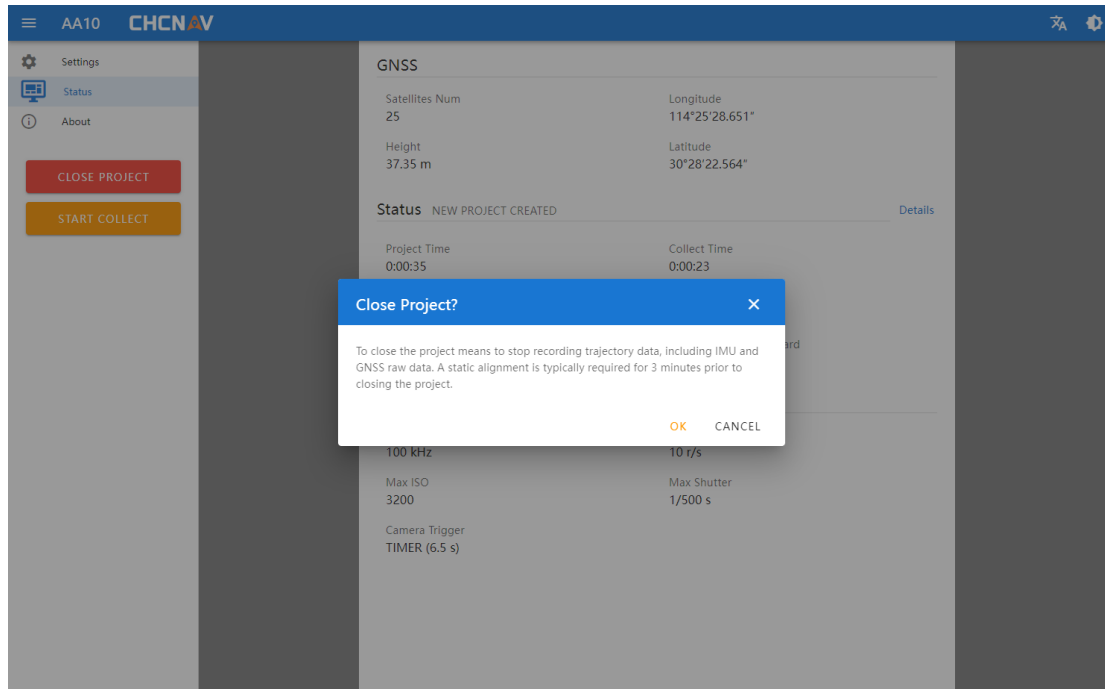


8. After 3 minutes slowly blink, click on "Start Collect", the indicator light on the device will change to quickly blink, which means AA10 start capture data. After that, the user can control the UAV to take off and start the mission.

9. After completing a single flight mission, the UAV will return and land. Connect to AA10 Wi-Fi and login to webpage. Click on "Stop Collect" to stop data capturing. The indicator light will change to slowly blink for another 3 minutes IMU static alignment.



10. After 3 minutes static, click on "Close Project", and the indicator light will change to solid green, which means project stop & save successfully.



11. Turn off the power of the UAV, and the device will automatically shut down.

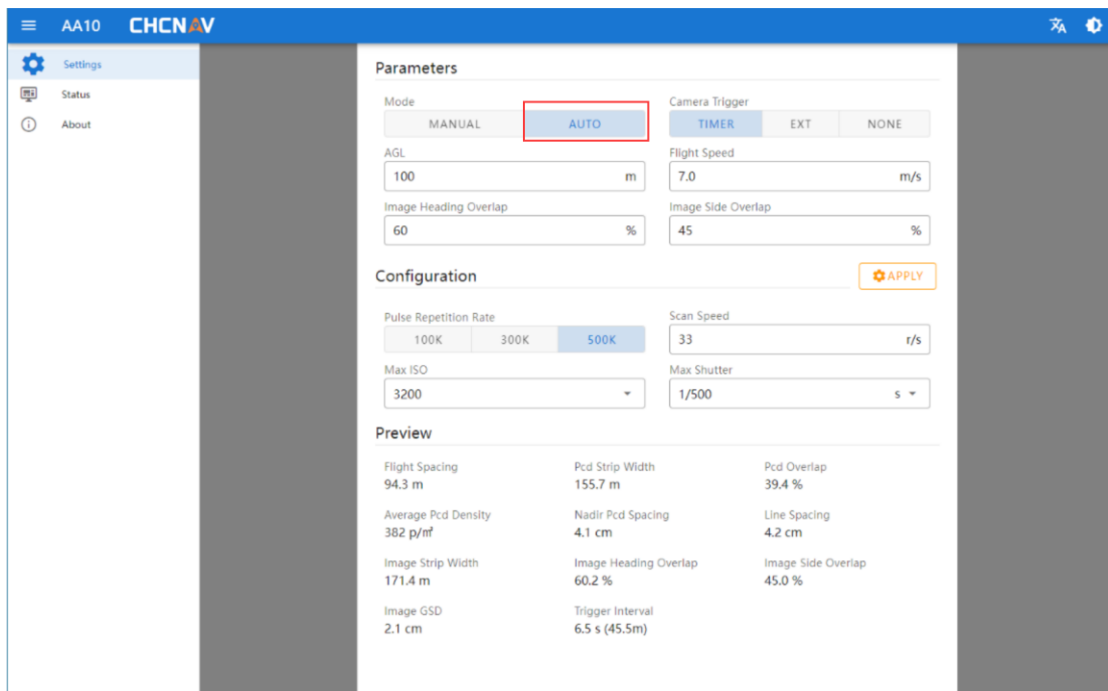
Note: The device supports saving configuration parameters. After power off and restart, the default settings will be the same as the last configured parameters.

6.2.2 AUTO Mode

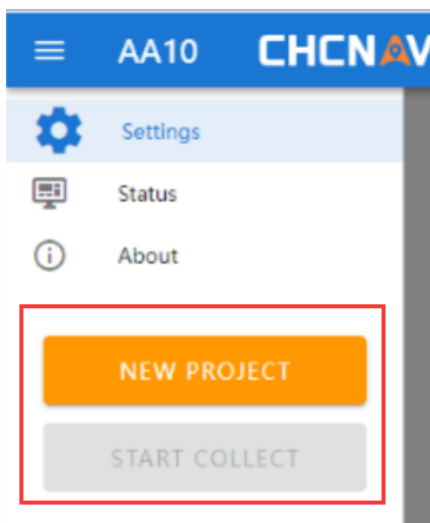
AA10 also supports AUTO mode which allows automatically start and stop. The specific workflow is as follows:

Steps:

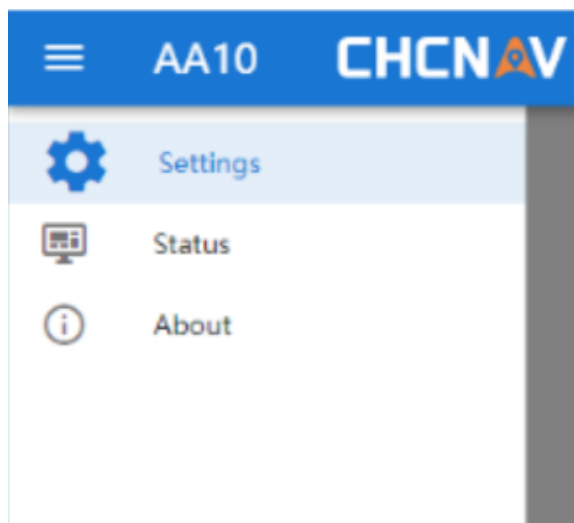
1. Click on "AUTO" button to switch to automatic operation mode.



Note: After switching to "AUTO" mode, the "New/Close Project" and "Start/Stop Collect" buttons will disappear.



"MANUAL" mode



"AUTO" mode

2. After the device initialization is complete, a new project will be automatically created. At this time, the indicator light on the device will change from a solid green to slowly blink.


3. Set the parameters, the method for setting parameters in automatic mode is the same as in manual mode. After 3 minutes static, the AA10 buzzer beeps for 1 second, indicating that the user can perform the aerial surveying mission.

4. The device automatically starts data collection by detecting its own vibration status. At this time, the indicator light of the device will start to quickly blink.


5. After completing a single flight mission, the UAV will return and land. The device automatically stops data collection by detecting its own vibration status when static more than 5 seconds. At this point, the indicator light of the device changes to slowly blink for another 3 minutes IMU static alignment.

6. After 3 minutes, the AA10 buzzer beeps for 1 second, indicating that the user can power off the device.

7. If multiple missions need to be performed at the same takeoff point, and the drone supports hot swapping of batteries without power interruption, user can directly perform the next mission after replacing the drone battery. In this case, when the device detects vibration, it will automatically start data collection for the next mission.

 **Note:** After data collection is completed in the "AUTO" mode, you also can manually switch to the "Manual" mode to close the project.

6.3 LiDAR Status Check

User can check AA10 LiDAR status on webpage: GNSS, status, and parameters. Click the  icon on the top-left corner of the webpage, and then click the "Status" button to switch to the status check interface for viewing.

GNSS Interface: This section displays the number of satellites and positioning information.

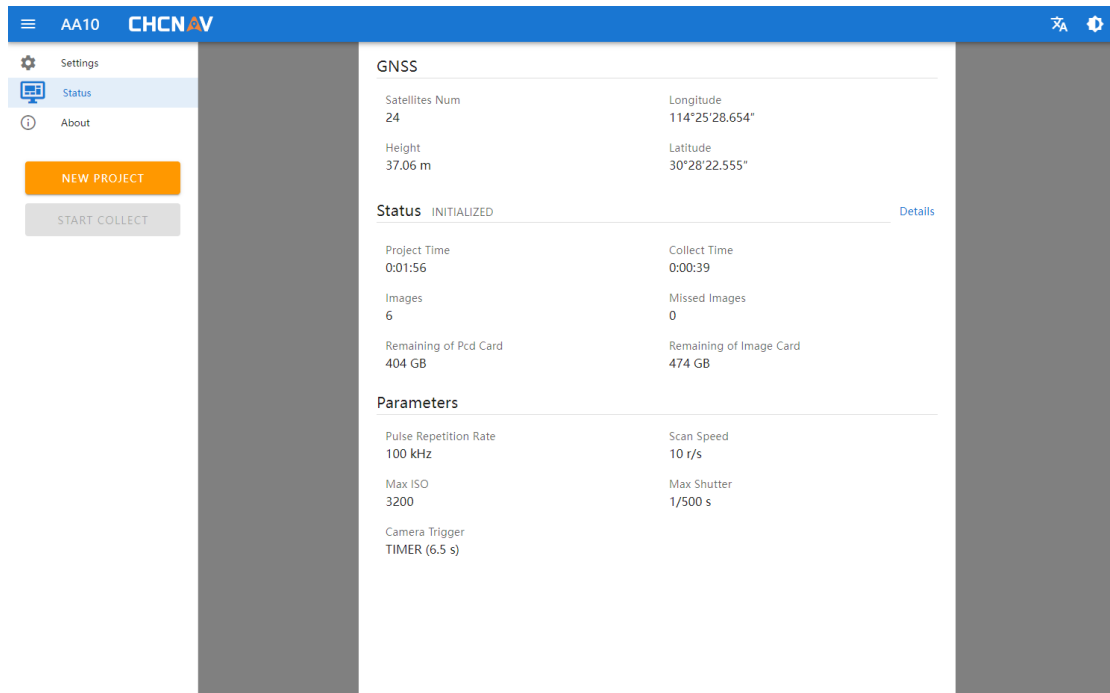
Status Interface: This section displays the project details.

- Project Time: The total time from project created;
- Collect Time: The total time of data captured;
- Images: Total captured picture number;
- Missed Images: The number of photos missed during the data collection.
- Remaining of Pcd Card: Available storage space on the point cloud storage card.
- Remaining of Image Card: Available storage space on the image storage card.

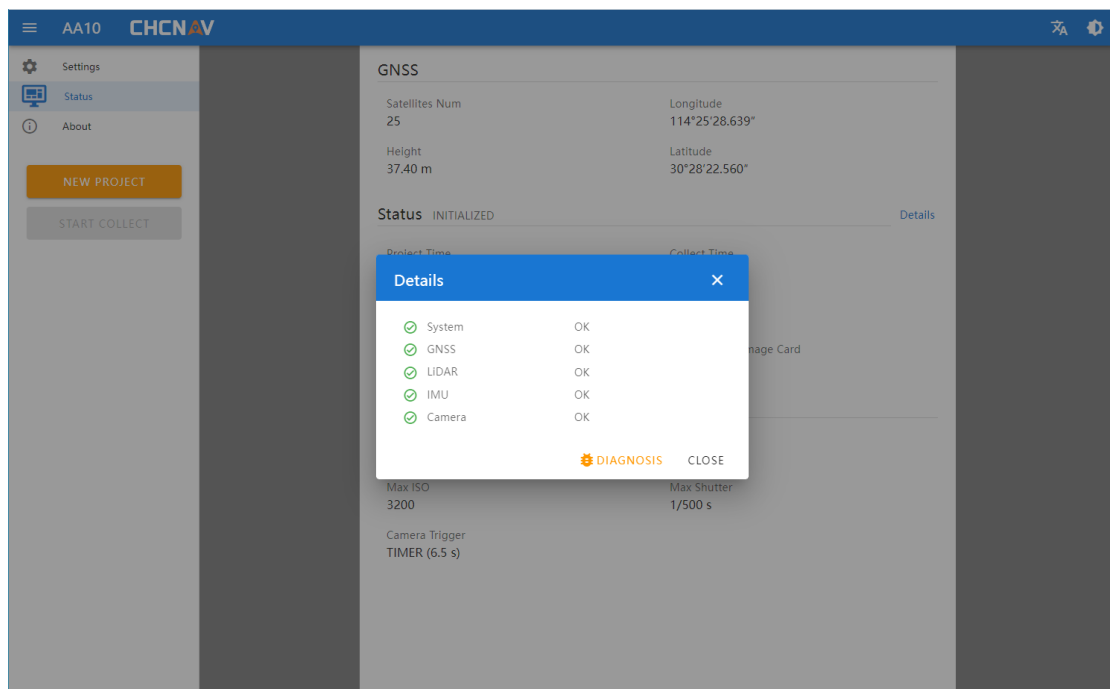
Parameters Interface: This section displays the project parameters:

- Pulse Repetition Rate: The project used PRR settings.
- Scan Speed: The project used scan speed.
- Max ISO: The maximum ISO value set for the camera.
- Max Shutter: The maximum shutter for the camera.
- Camera Trigger: The time interval for the camera pictures.

User can easily access and view this information by clicking the "Status" button after clicking the icon on the top-left corner of the webpage.



Click "Details" will display the current status of "System", "GNSS", "LiDAR", "IMU" and "Camera".

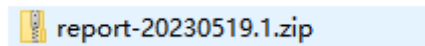


6.4 Log Download

When the device encounters an abnormal situation, it will be displayed in red on the software interface. In the "Details" section, user can view the reason for the abnormality, which will be indicated by a red exclamation mark (!) as a warning sign.

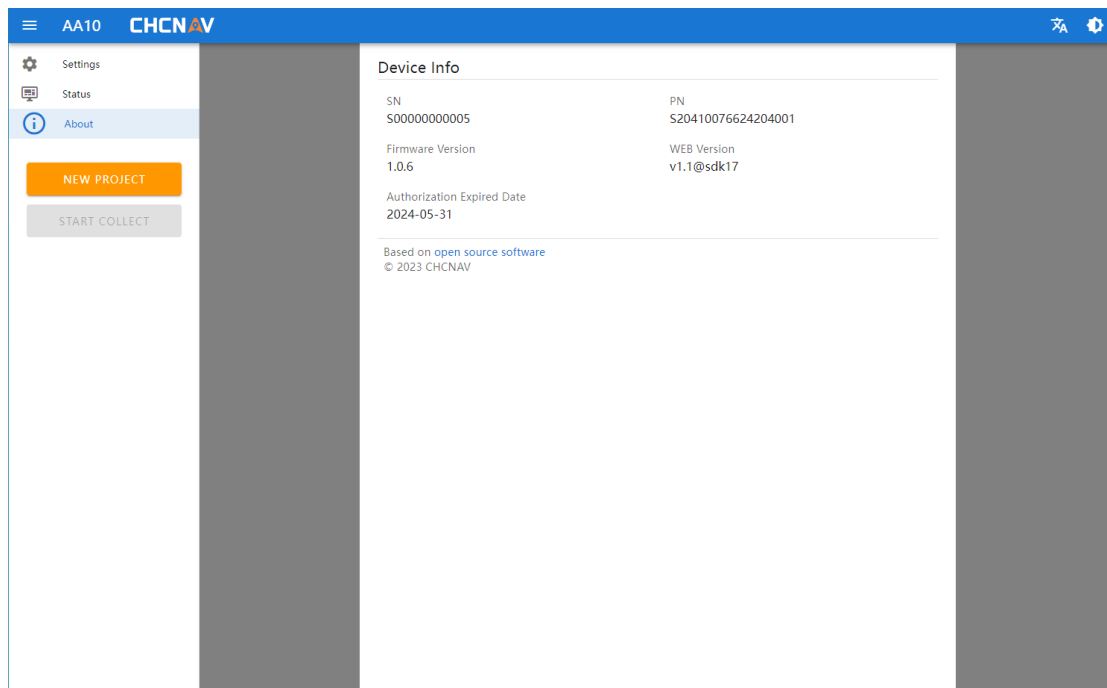
If AA10 cannot be operated properly, user can download a diagnostic report from the "Details" and send it to CHCNAV support team for analysis. Here are the steps to download the diagnostic report:

1. Go to the "Details" section on the software interface.
2. Click on the "Diagnosis" option.
3. Select the desired date for which you want to generate the diagnostic report.
4. Click on the "Download" button.



6.5 Authorization

The "About" interface displays the device's Serial Number (SN), Part Number (PN), Firmware Version Number, and the expiration date of the authorization. If the LiDAR expired, please contact CHCNAV support team and send AA10 SN.



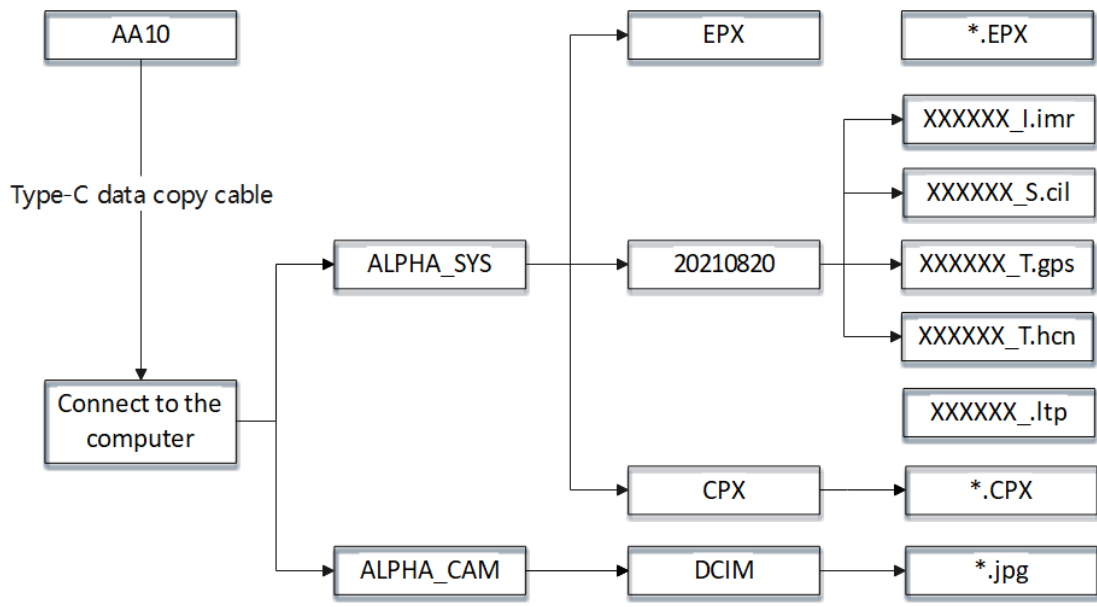
7 Data Copy Steps

Connect the AA10 to the computer with the type-C cable, the computer will pop up two disks: ALPHA_SYS contains laser data, GNSS & IMU data, and ALPHA_CAM contains picture data. User need uses CoPre2 software to automatically export all data under a same project folder.



Note: Connect the AA10 to the computer with the type-C cable when the device is powered off. Otherwise, the SD card (data storage card) cannot be recognized.

7.1 Disk Structure



- ALPHA_SYS: Both laser & GNSS & IMU data are recognized based on capture date. For example: “20210820” means the data was collected on August 20, 2021.
 - xxxxxx.ltp: Laser data.
 - xxxxxx_I.imr: IMU data.
 - xxxxxx_S.cil: Synchronizes data.
 - xxxxxx_T.gps/ xxxxxx_T.hcn: GNSS data.
 - *.EPX: Laser calibration file.
 - *.CPX: Camera calibration file.
- ALPHA_CAM: Store picture data.

Note:

1. *.EPX & *.CPX: Default calibration files which cannot be modified or deleted.
2. Please do not delete or manually format disks, otherwise it will influence data copy. User can find a backup parameter folder on USB disk if the disk folder has been deleted.

7.2 Data Copy Tool

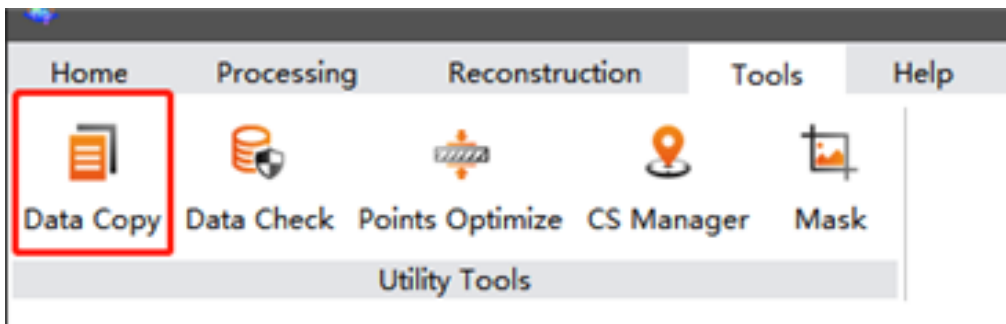
User need uses data copy tool from CoPre2 software to automatically copy raw data from the device to PC.

Steps:

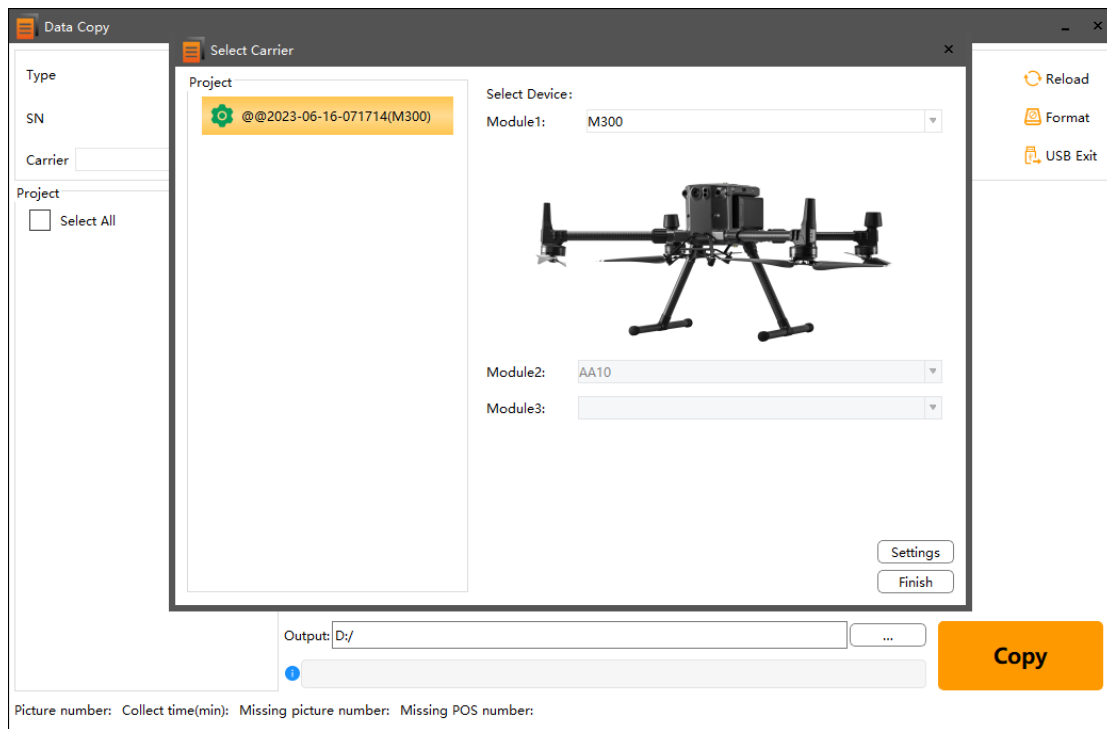
- Connect the AA10 to the computer with the type-C cable, and computer will pop up two disks: ALPHA_SYS and ALPHA_CAM.



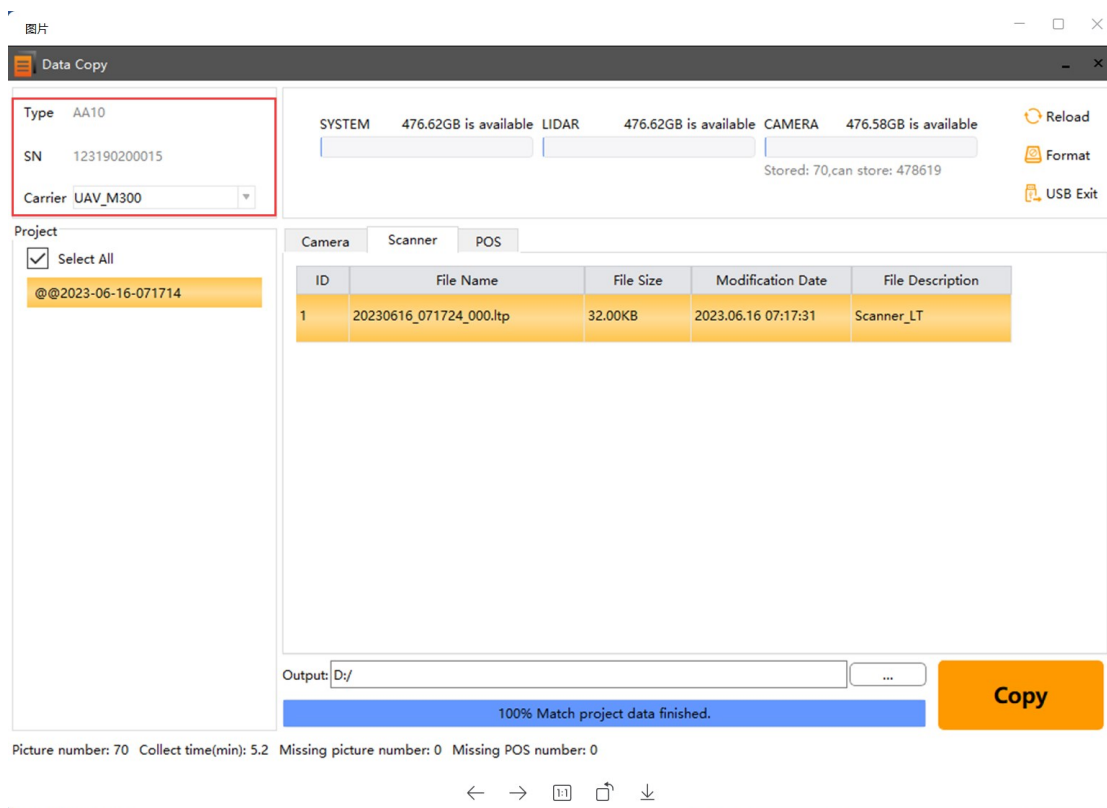
- Click “Tools - Data Copy”:



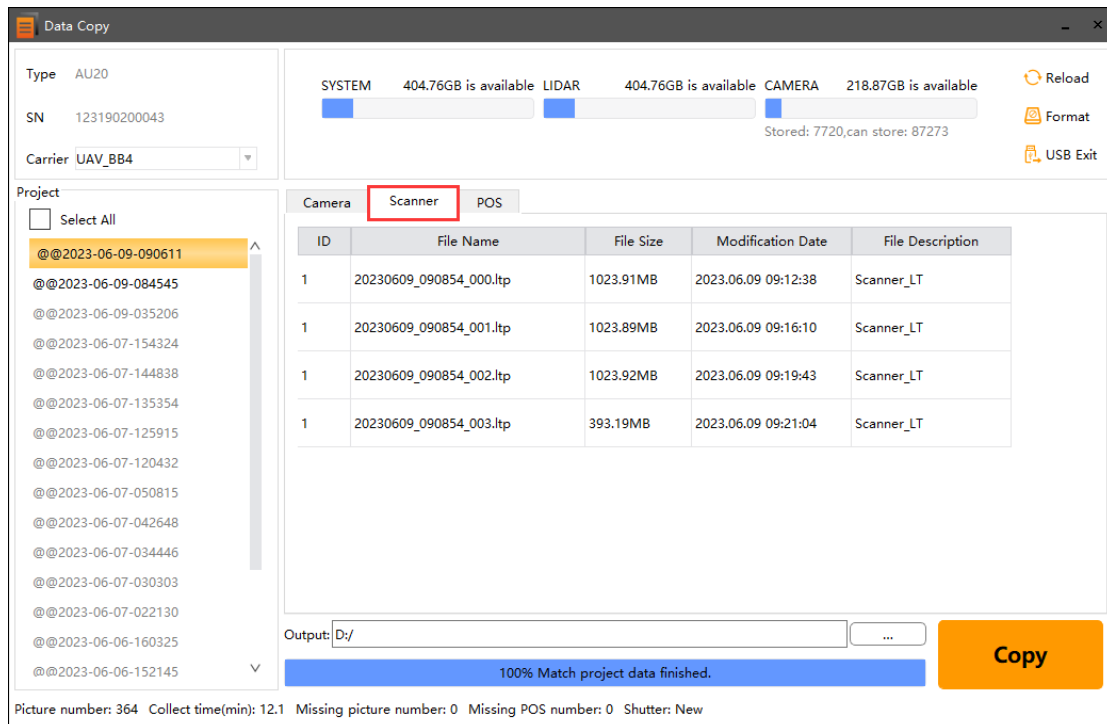
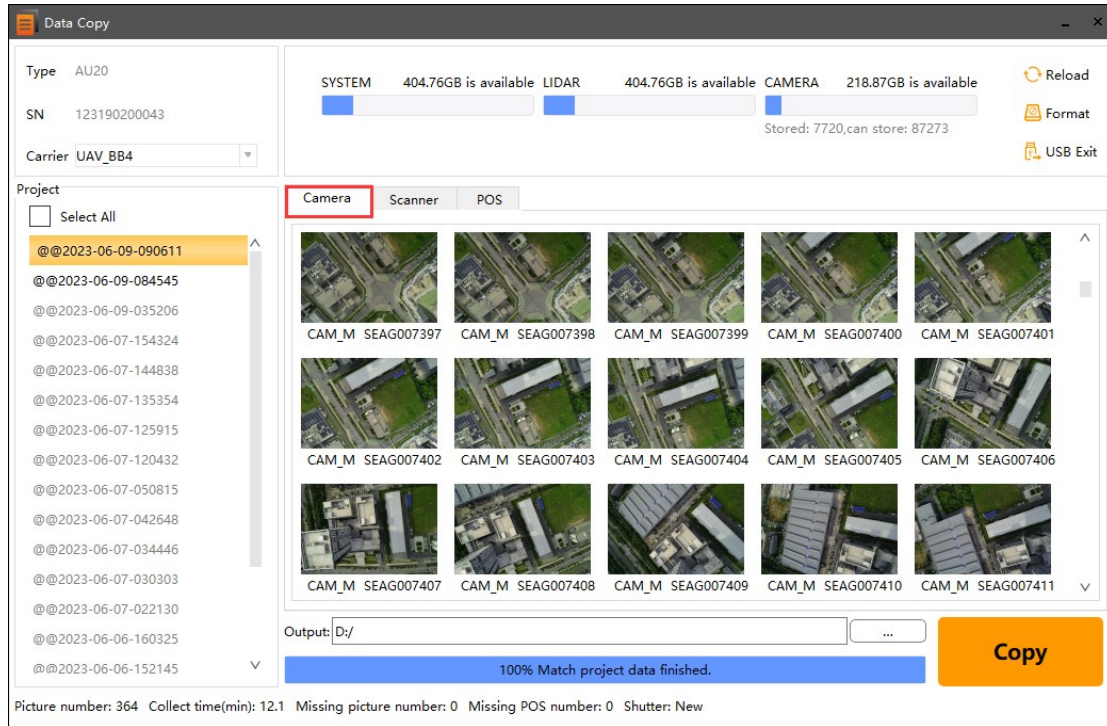
- Choose the correct device from “Module1” list, then select projects from left list and click “Settings”. Finally, click “Finish”.

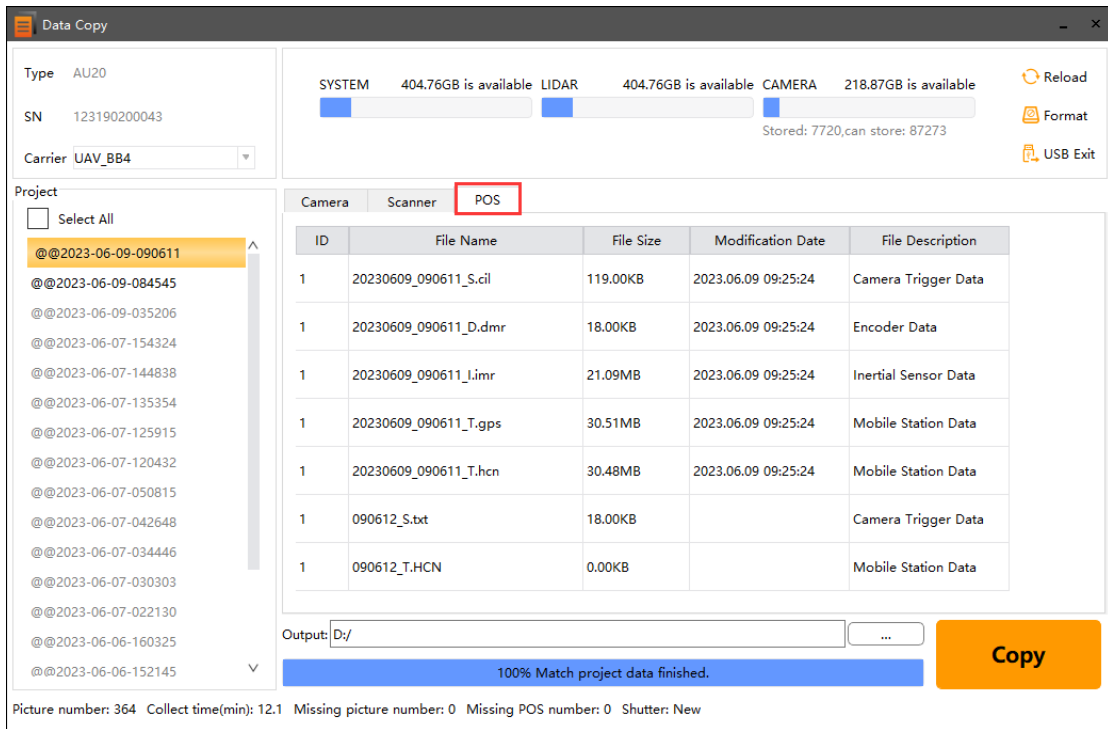


- The data copy tool will read LiDAR type and SN on left top corner.



- User can check project data folders of the device in the data column on the left. Select one or multiple sets of data, then it will display corresponding camera pictures, laser and GPS data on the right side.



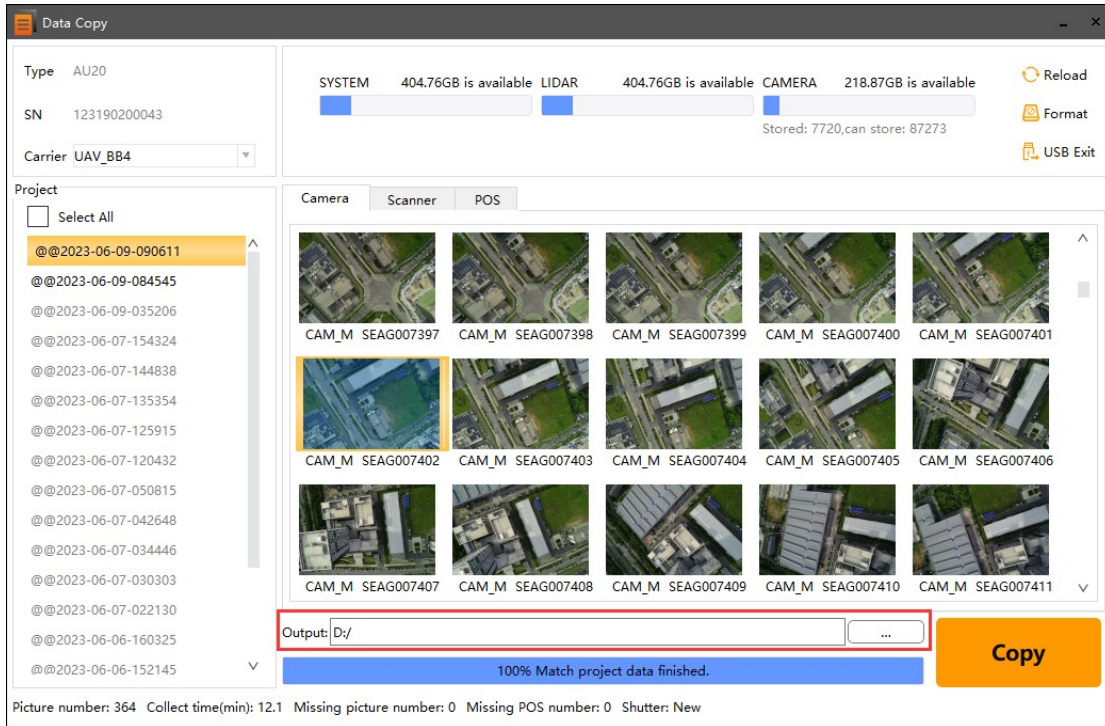


Note: Select one or multiple sets of data needed to copy with Ctrl and Shift shortcuts.

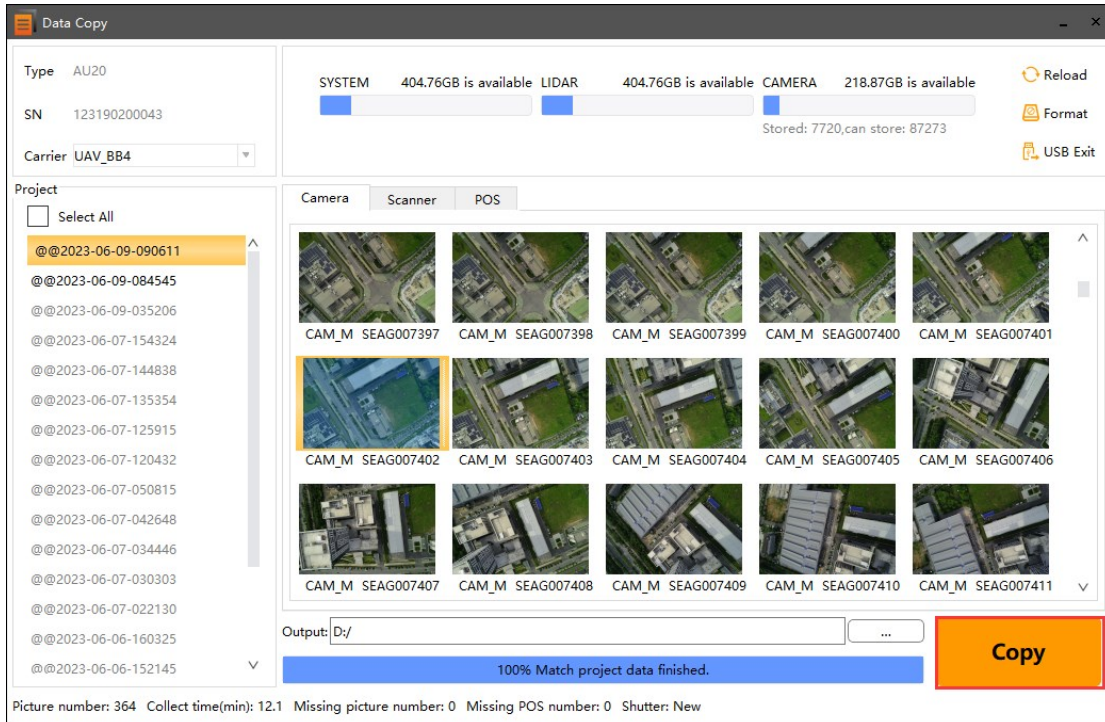
Note: Double-click on a photo to view the details.

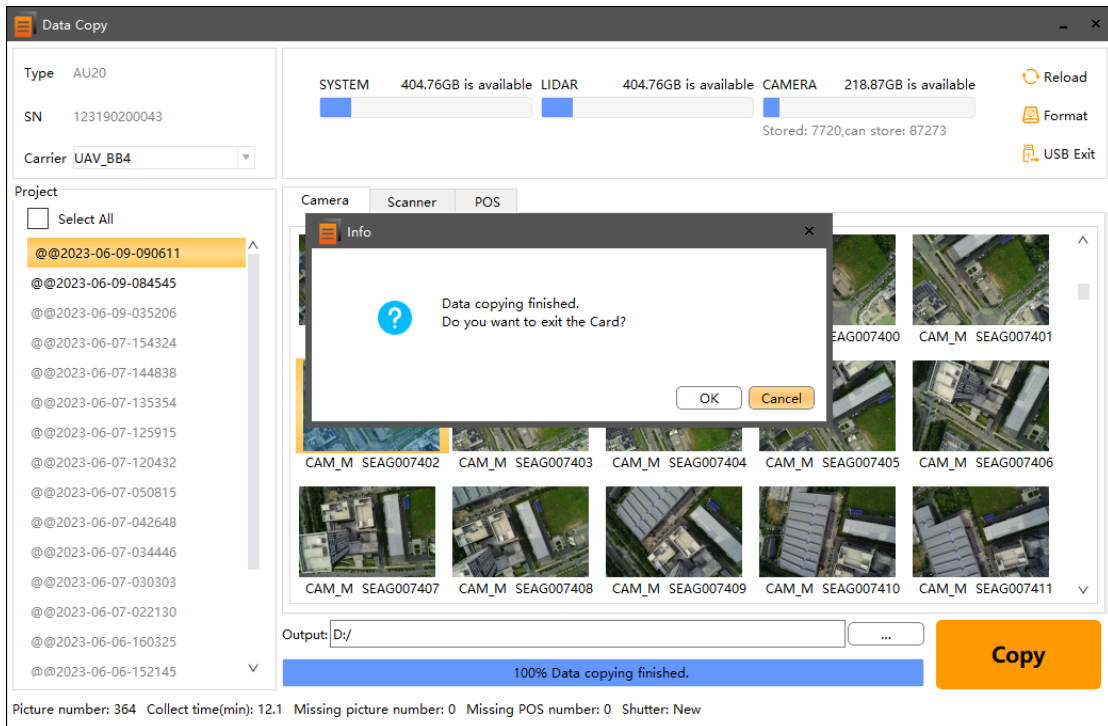
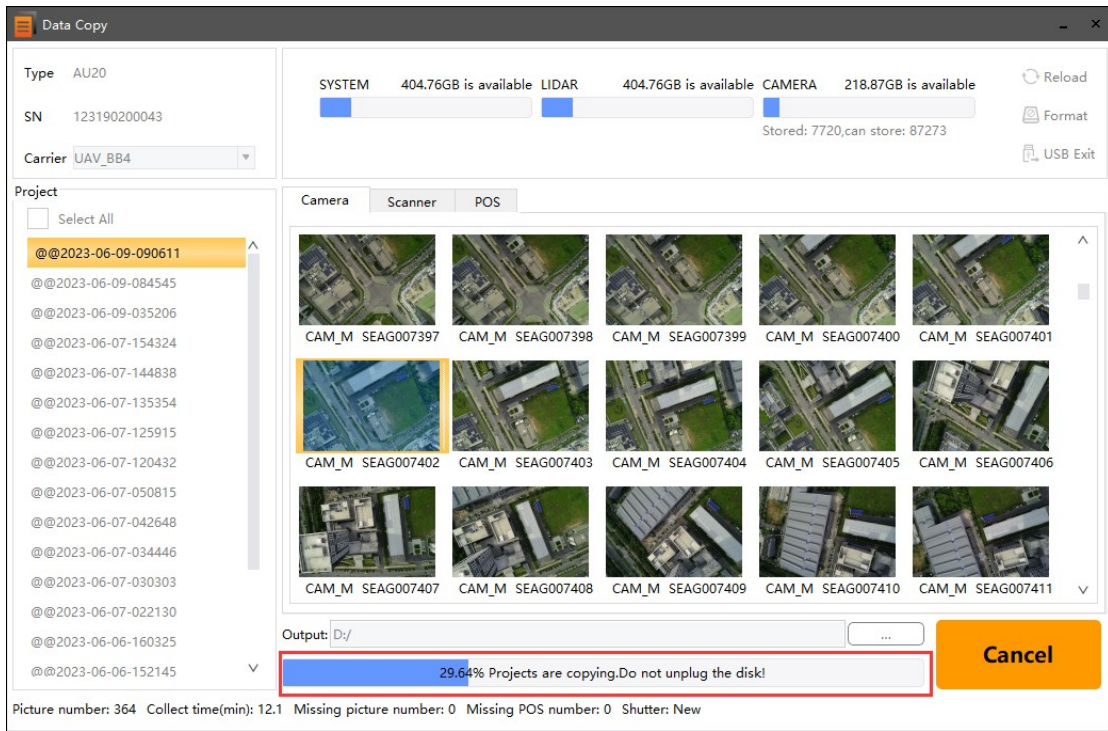


- Define an output path to save project data.



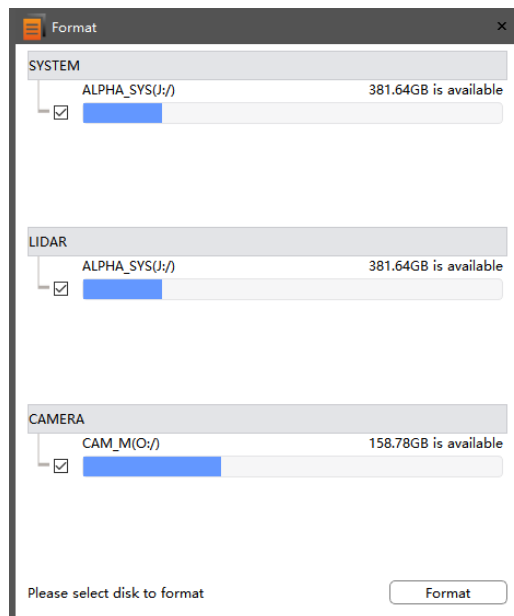
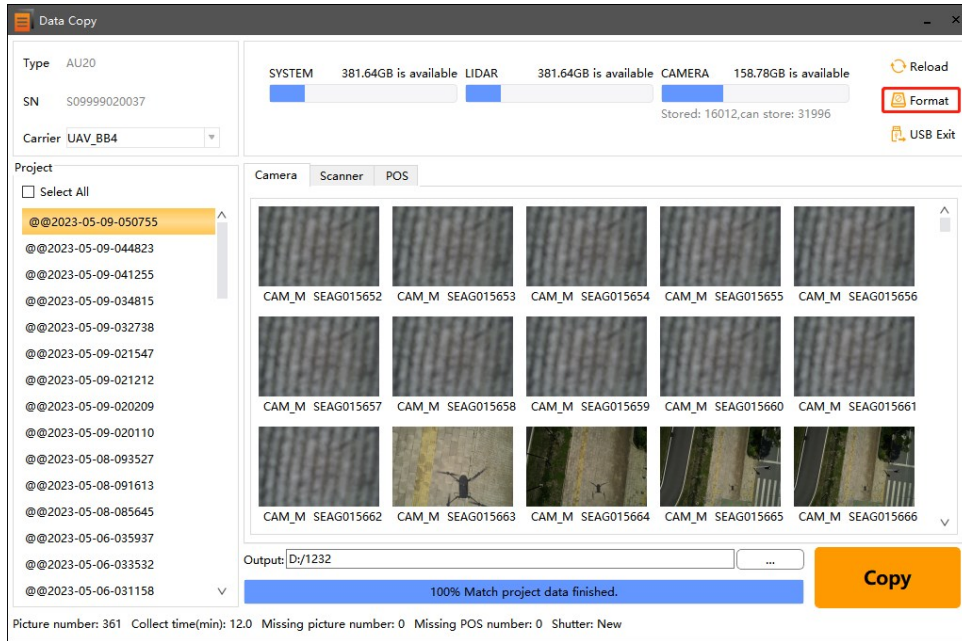
- Click "Copy" and it will automatically copy selected data projects.





7.3 Disk Format

If the disk storage space is insufficient, user can click “Format” icon on the upper right corner to format the disk. This format will only delete project data, but not delete default parameter folder.

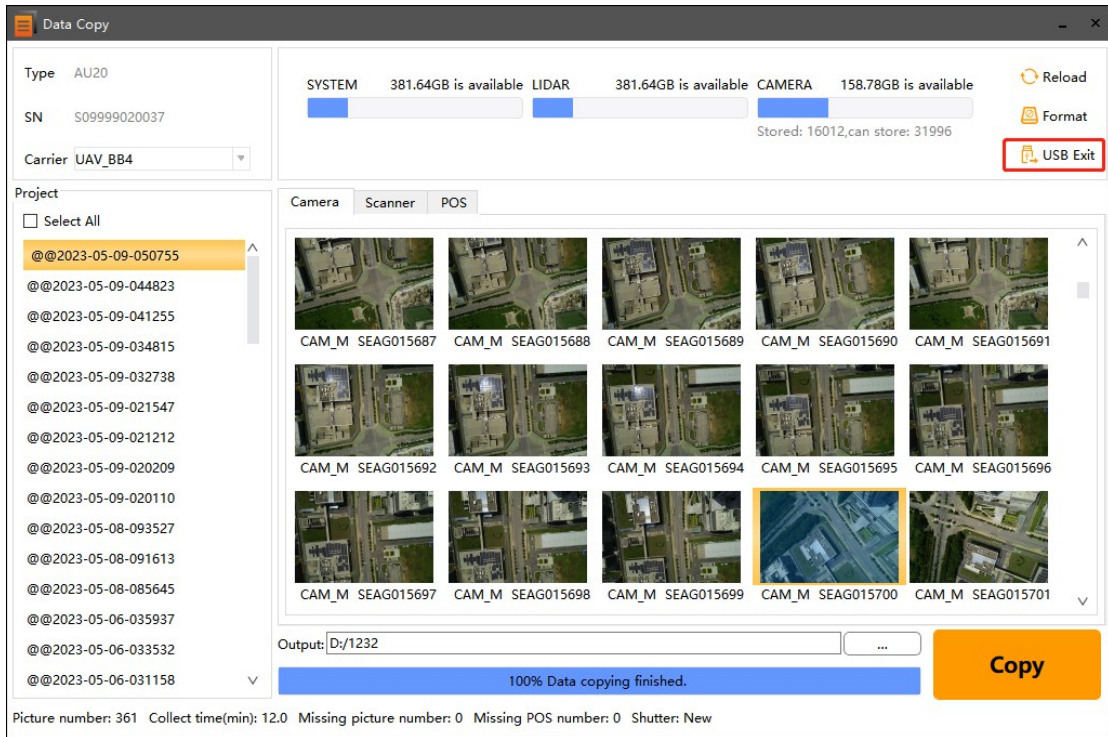


Note: If one of disk memory is less than 10% or cannot meet storage requirements, user need to empty disk memory in advance.

Note: User can only format disk via data copy tool, otherwise, the default folders inside disk will be deleted, which will cause error.

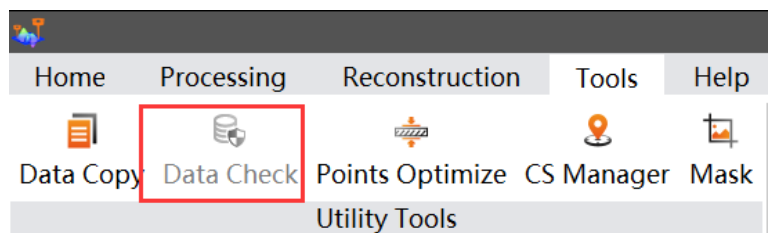
7.4 USB Exit

After data copy finished, click “USB Exit” to eject disks first, then disconnect type-C cable between AA10 and PC.

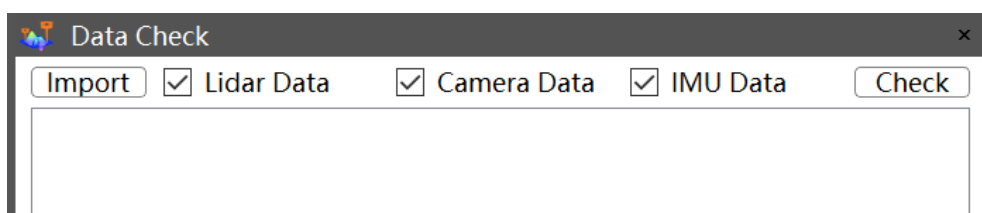


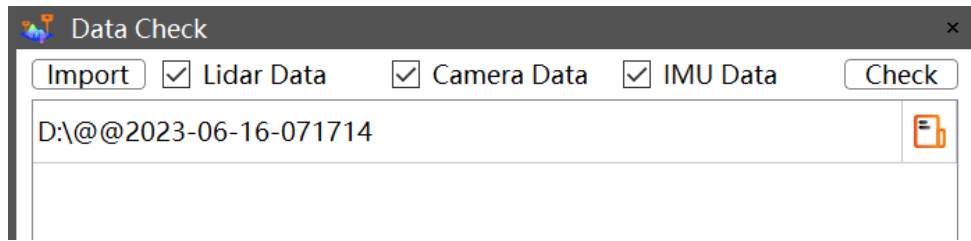
7.5 Data Check


User can use “Data Check” function to check whether the project is correct.

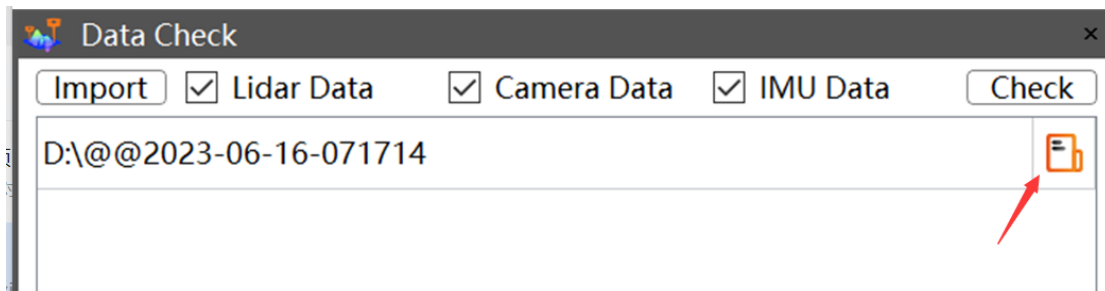


Click “Import” to import project folder and click “Check” to start checking.





- Click  icon, user can open the data check report:



Source Data Quality Report

2023-06-16 16:04:13

1. Project Summary:

Project Name	@@2023-06-16-071714
Collect Time(min)	5.191

2. Camera Statistics:

Camera	Number of Images	Number of Trigger	Status
Camera1	70	70	Pass

3. Scanner Statistics:

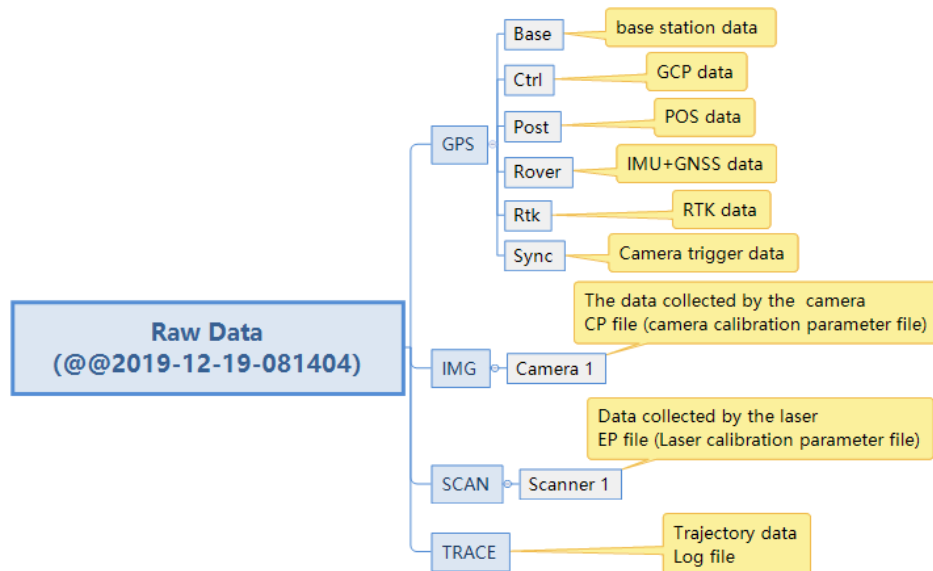
Scanner	Lidar File	Start Time	Stop Time	Status
Scanner1	20230616_071724_000.ltp	0:00:00	0:00:00	Damage

4. IMU Statistics:

IMU File	Status
20230616_071714_Limr	Pass

7.6 Data structure

Data copy tool will create a project folder with defined structure automatically after data copy. Details can see below figure.



The data project folder will be named based on capture date & GPS time by default, for example “@@2021-07-30-030325”. There are four folders: GPS, IMG, SCAN and TRACE.

GPS	3/7/2022 4:00 PM	File folder
IMG	3/7/2022 4:00 PM	File folder
SCAN	3/7/2022 4:01 PM	File folder
TRACE	1/28/2022 12:09 AM	File folder

7.6.1 GPS

The GPS folder stores GNSS, IMU and processed POS data. It contains six sub-folders:

Base	2023/6/12 13:39	文件夹
Ctrl	2023/5/9 8:48	文件夹
Post	2023/8/15 15:35	文件夹
Rover	2023/6/1 17:37	文件夹
Rtk	2023/5/9 8:48	文件夹
Sync	2023/5/9 8:48	文件夹

- Base folder stores static data from base station. It is empty by default, and user need manually copy static data inside here for POS solve in CoPre2.
- Ctrl folder stores GCP file. It is empty by default, and user can choose to save GCP file here for proper data management.

- Post folder stores trajectory file (.PosT format). It is empty by default, and after POS solve in CoPre2, it will generate a lot of new files.
- Rover folder stores LiDAR GNSS & IMU data. Those files will be stored automatically after the data copy is finished.
- RTK & Sync are reserved folders. They are empty by default.

7.6.2 IMG

IMG folder stores captured picture data with .CP calibration file under “Camera1” folder. The raw pictures are not geo-tagged, and after picture process finished in CoPre2 software, it will store renamed geo-tagged images.

7.6.3 SCAN

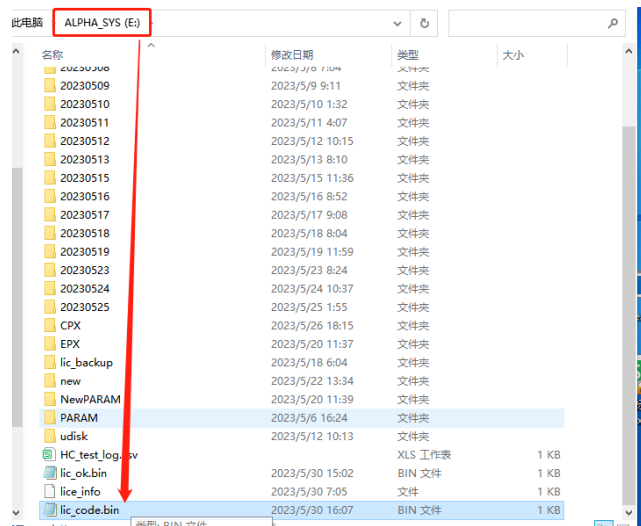
SCAN folder stores captured laser raw data files with .EP calibration file UNDER “Scanner1” folder. The raw laser data is .ltp format.

7.6.4 TRACE

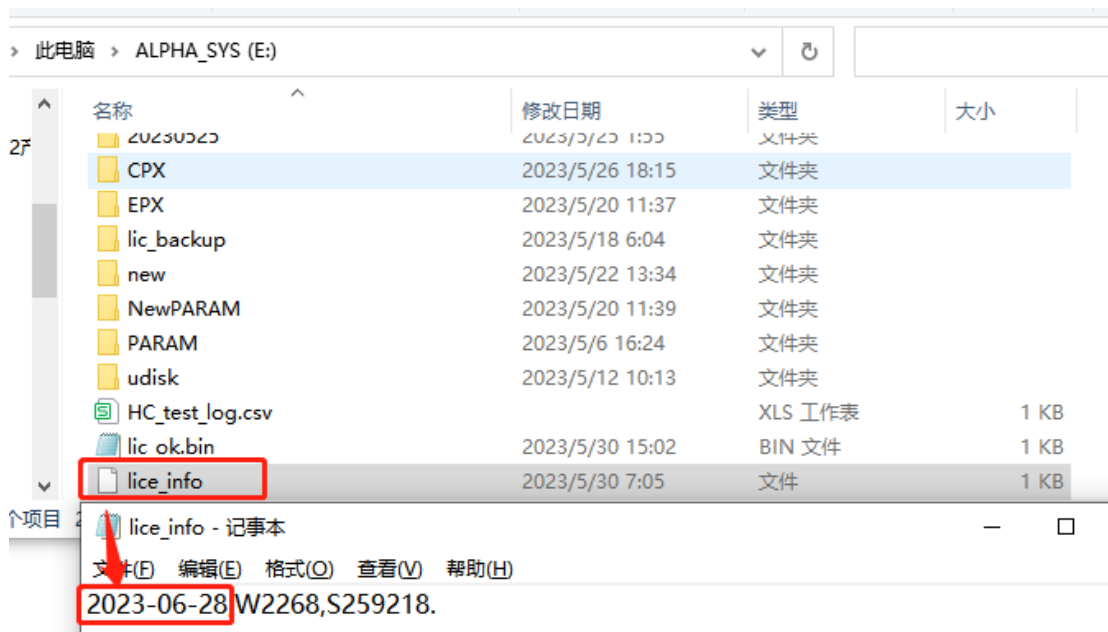
TRACE folder is a reserved folder. It is empty by default.

8 AA10 Authorization Guide

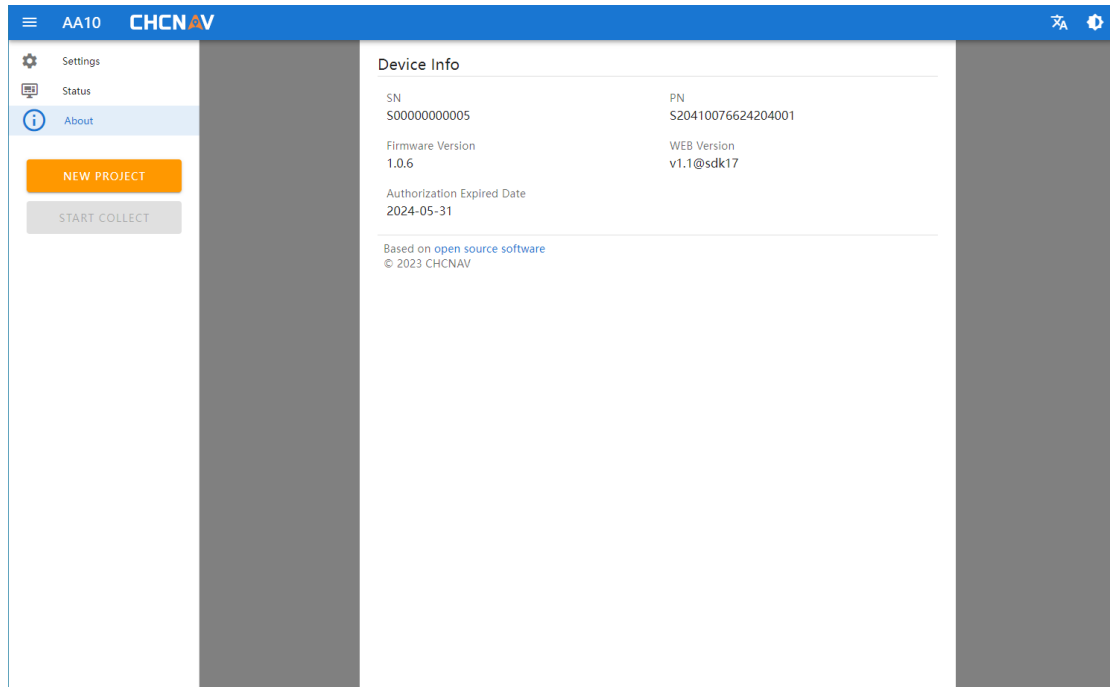
If the device license is about to expire, please contact CHCNAV Support team for registration extend or a permanent license. CHCNAV support team will provide a "lic_code.bin" file, and user need save it under ALPHA_SYS disk, then power on AA10 and it will finish register automatically.



User can open the "lice_info" file to check the updated expired time.



Users can also check the authorization status through the webpage.



9 Matters Need Attention

9.1 Important Notes

The LiDAR measurement system is a complex and precise measurement system. In daily carrying, use and storage, please operate the equipment correctly and maintain it properly. Some important notes are listed below:

- Do not disassemble equipment yourself. If the unit has a problem, contact the CHCNAV support team.
- Please use the standard battery and accessories. Use of a non-original battery may cause the charger to explode or burn. Use of non-original accessories is not covered by warranty.
- Please use the standard battery and accessories. Use of non-designated battery may cause the charger to explode or burn. Use of non-original accessories is not covered by the warranty.
- When using a charger for charging, keep away from fire, flammable or explosive materials to avoid serious consequences such as fire.
- Avoid strong shock or vibration.
- If you need to continue using the instrument for a long time or under special conditions such as high humidity, please consult the CHCNAV Support Team for appropriate precautions in advance. In general, the damage caused by a special environment is not covered by the product warranty.

9.2 Product Transportation

- The CHCNAV AA10 product has a special transport case. Be sure to secure the case during transportation.
- Mention the need for careful handling during transportation. Also, attach fragile labels to the case.
- If the product is shipped by express service, the container must have an outer box with foam inside, also for safety.
- When transporting or moving batteries, take proper measures to prevent materials from falling or being damaged.

9.3 Using Tips

- The equipment should be handled carefully during use to avoid soiling and scratching its surface, and it is strictly forbidden for surveyors or others to sit on the container.
- After the outdoor test or operation, the surface of the equipment should be cleaned regularly (3-5 days) with the provided clean suits, and check whether the structural screws and plugs are loose, and whether the peripheral cables are loose.

- After a long period of storage, it should be taken out periodically (about one month) for power-on test to check whether the function is normal.
- The ambient temperature limit is between -20°C and +50°C.
- If the unit is disassembled or loosened, it should be recalibrated.
- If it is difficult to turn the rotating parts of the equipment, please do not turn them forcibly. If the product is damaged, do not continue to use it or the damage to the product will increase. Do not disassemble the product in the field.
- If it rains or snows in the field during operation, please bring the equipment inside the container.

9.4 Storage Tips

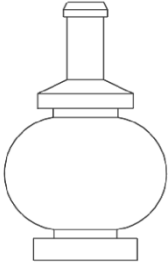

- The storage area should be clean, dry, bright, and well ventilated.
- It should be placed flat or upright, not casually leaned, to prevent deformation.

10 Frequently Asked Questions

- The device cannot be turned on or off normally: Check that the power supply and connection port are normal. If it still does not turn on or off, contact CHCNAV support team for repair.
- Device cannot be synchronized or takes a long time: Check whether the connection of the GPS power cable is stable.
- If the user cannot access the web page when connecting to the unit using the mobile phone's WiFi function, the user may need to disable mobile data on your phone.
- If images appear dark, check the camera's shutter settings to make sure they are appropriate.

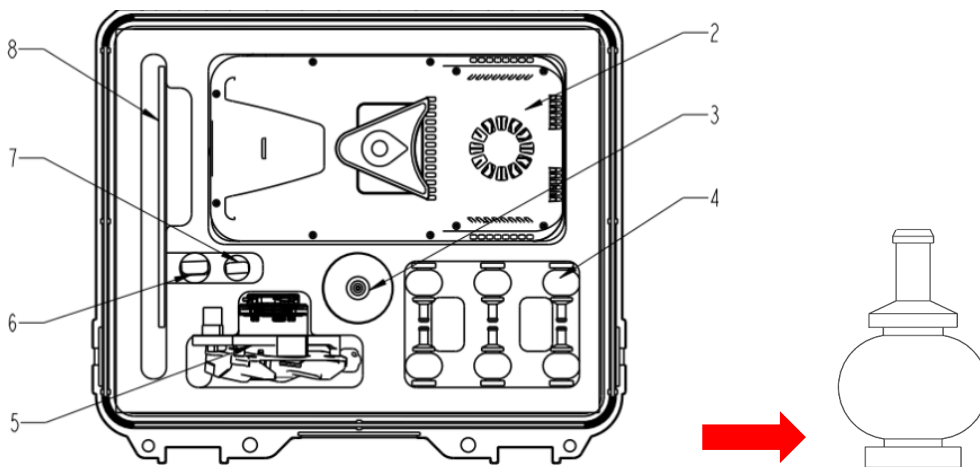
11 Appendix

11.1 Replace M300 Shock Absorbing Balls

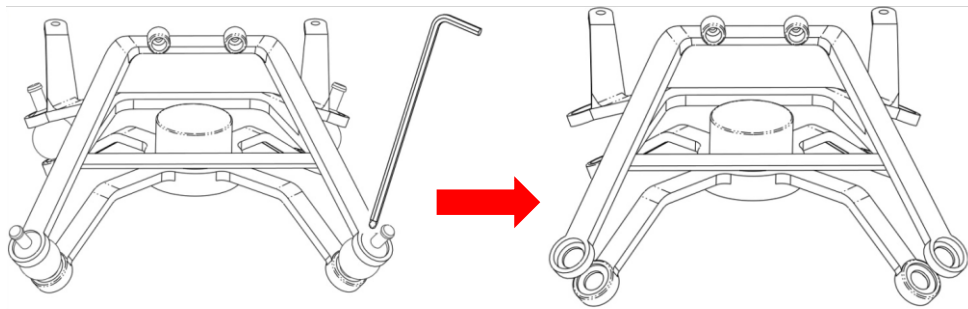
Pictures	Name	Pcs
	Shock-absorbing ball module	6
	M4 allen wrench	1

Note: Since the maximum load weight of the original shock-absorbing ball of the M300 is less than 1Kg, so it is necessary to replace the original shock-absorbing ball to the new equipped balls.

- Take out the shock-absorbing balls from the transport container (slot 4).



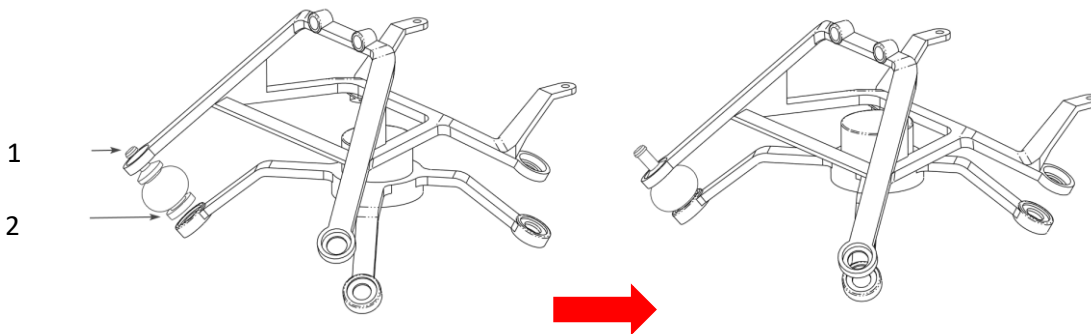
As shown in the following figure, remove 4 original shock-absorbing balls from M300 using M4 allen wrench (it is recommended to replace all the original shock-absorbing balls one by one). Push the shock-absorbing ball from the groove edge towards the center. Repeat this process a few times until it comes off. Avoid pulling or yanking with force, as it may cause damage to the shock-absorbing ball.



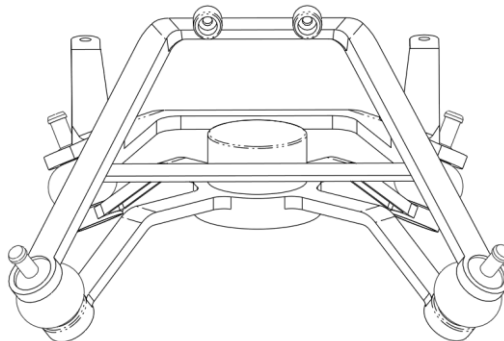
When removing the shock-absorbing ball, use the round end "1" to remove it. Do not use the right-angle end "2" to remove it, as it may damage the shock-absorbing balls.



Replace all the original shock-absorbing balls one by one. When installing the new shock-absorbing ball, insert the bottom rubber ring down first, then insert the top rubber column from the top bracket and pull the rubber column up.



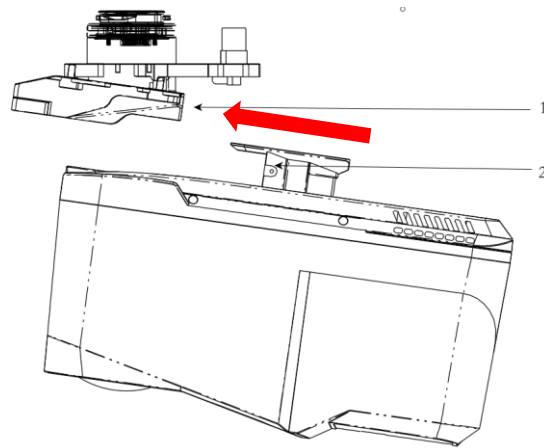
1- Top rubber column; 2- Bottom rubber ring



It is recommended to install a new shock-absorbing ball every time when user remove an original one to prevent the load plate from falling off or becoming misaligned.

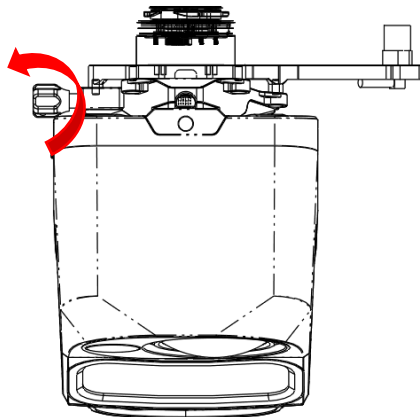
11.2 M300 Installation Steps

- Push the “Alphaport” slider of scanner into the quick-release clamp which on the bottom of the airborne mounting platform in the direction of the arrow until hear a “click” sound.

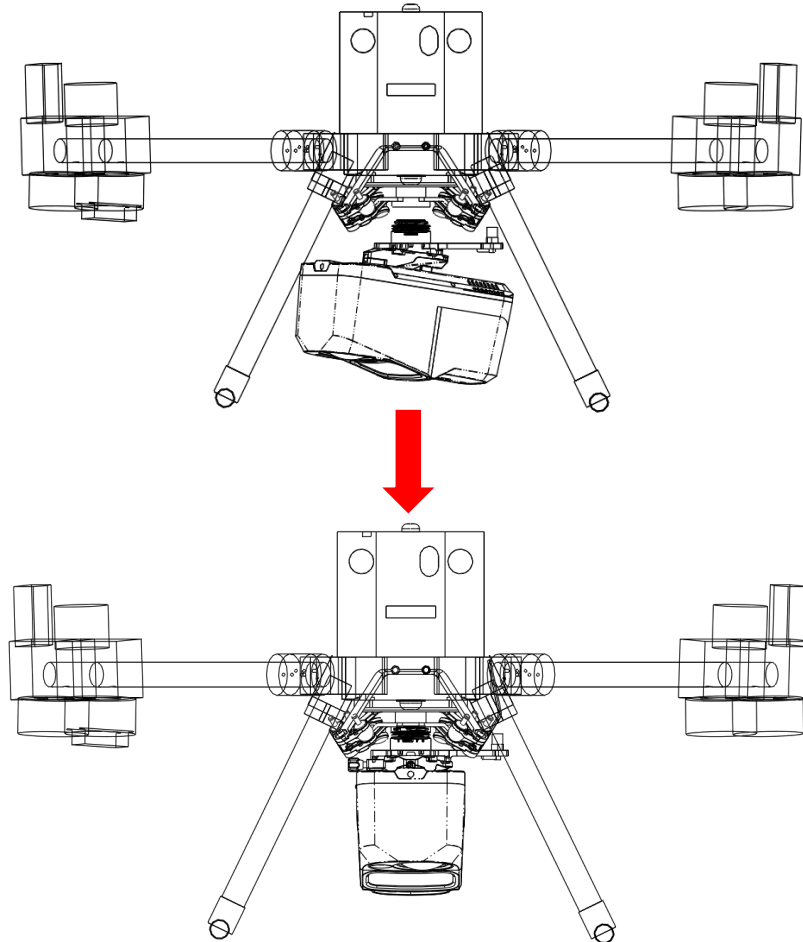


1- quick-release clamp; 2- Alphaport

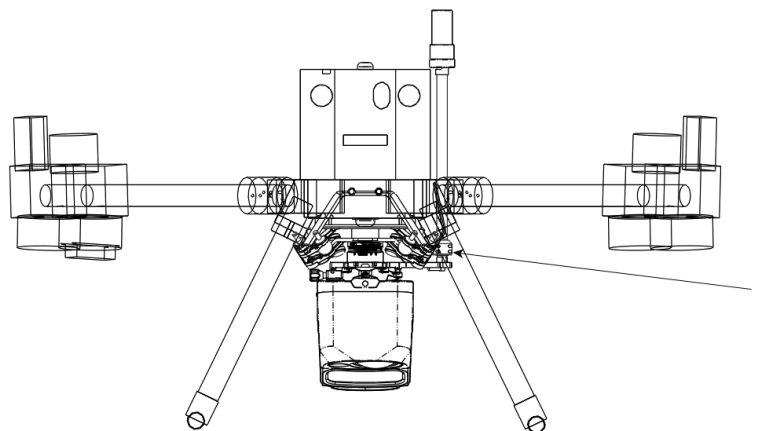
- Tighten the side screw bolts to make it stable and finally finished the installation.



- Align the white dot on the device Skyport interface with the red dot on the M300 interface and embed it in the installation location. Rotate the device SkyPort interface to the locked position (red dots align red dots) to be fixed.



- Insert the rod antenna into the antenna mount and tighten it.



11.3 Install AA10 On Other Platform

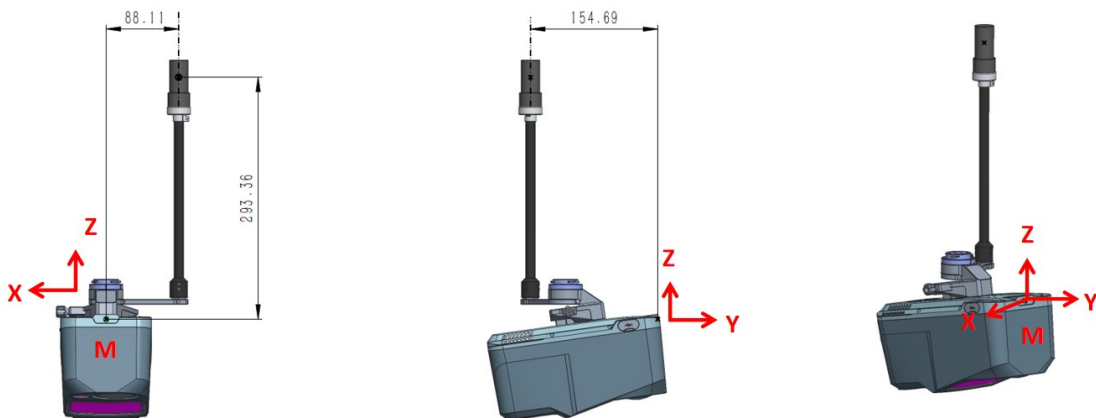
If install AA10 on a third-party aircraft, it is necessary to measure the Lever Arm Offset value from Sensor Measurement Origin to Antenna Phase Center.

11.3.1 How to measure Lever Arm Offset

Use total station to measure the Lever Arm Offset value from Sensor Measurement Origin to Antenna Phase Center, the coordinate system takes the Sensor Measurement Origin as the original point. Show as follow (Please refer to the actual antenna phase center):

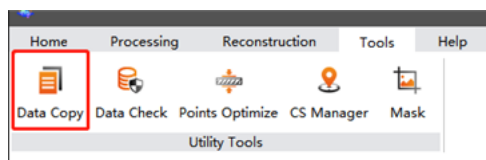
- “M” is Sensor Measurement Origin on AA10 (LED indicator light).
- X is right, Y is forward, Z is up direction. If the direction is opposite, then value is negative.

For example: If use default antenna, then TX = -0.08811m, TY = -0.15469m, TZ = 0.29336m.

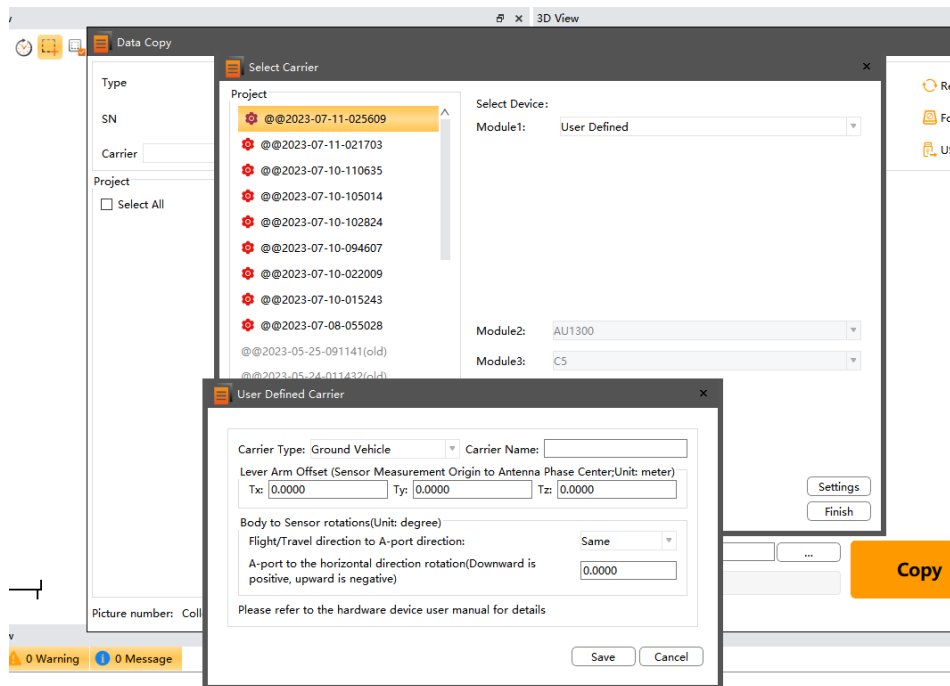


11.3.2 How to generate a new EP in CoPre

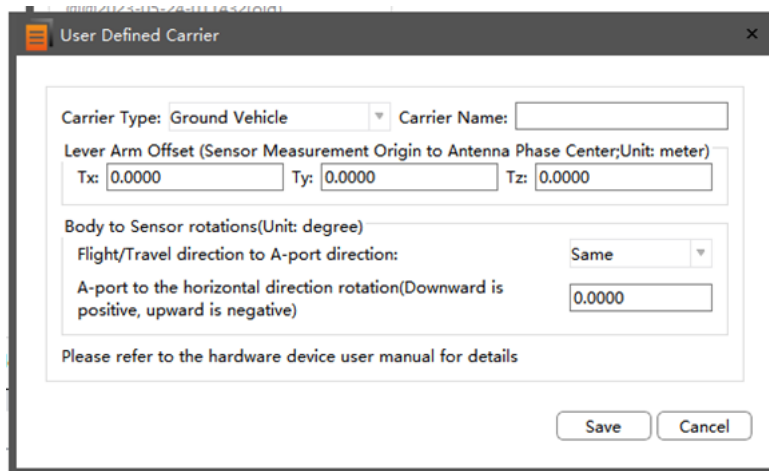
- Click “Tools->Data Copy” ;



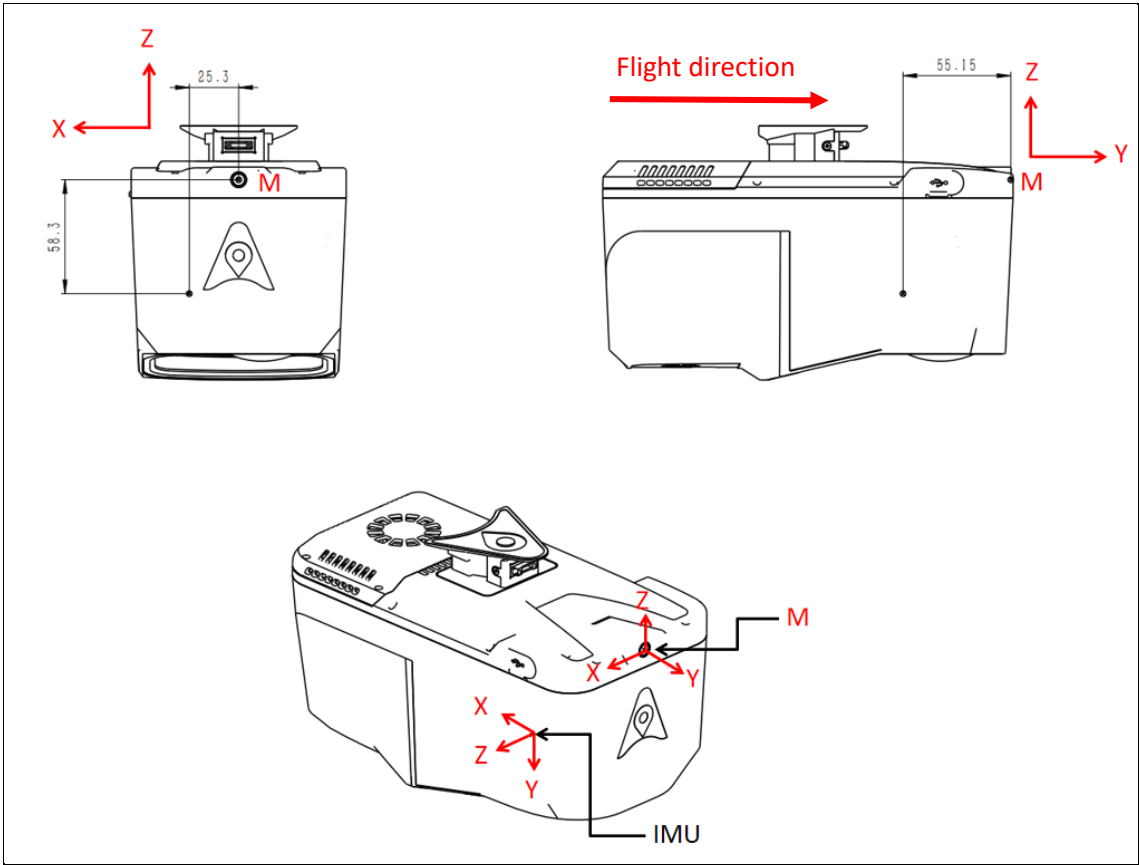
- Select User Defined when copying data:



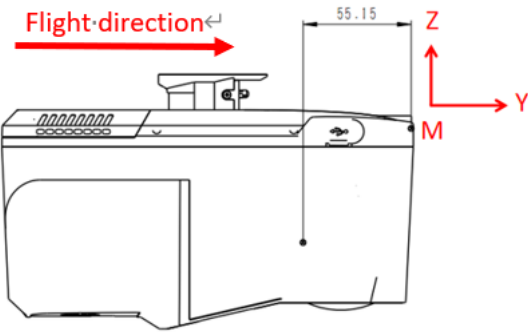
- Set parameters as shown below.



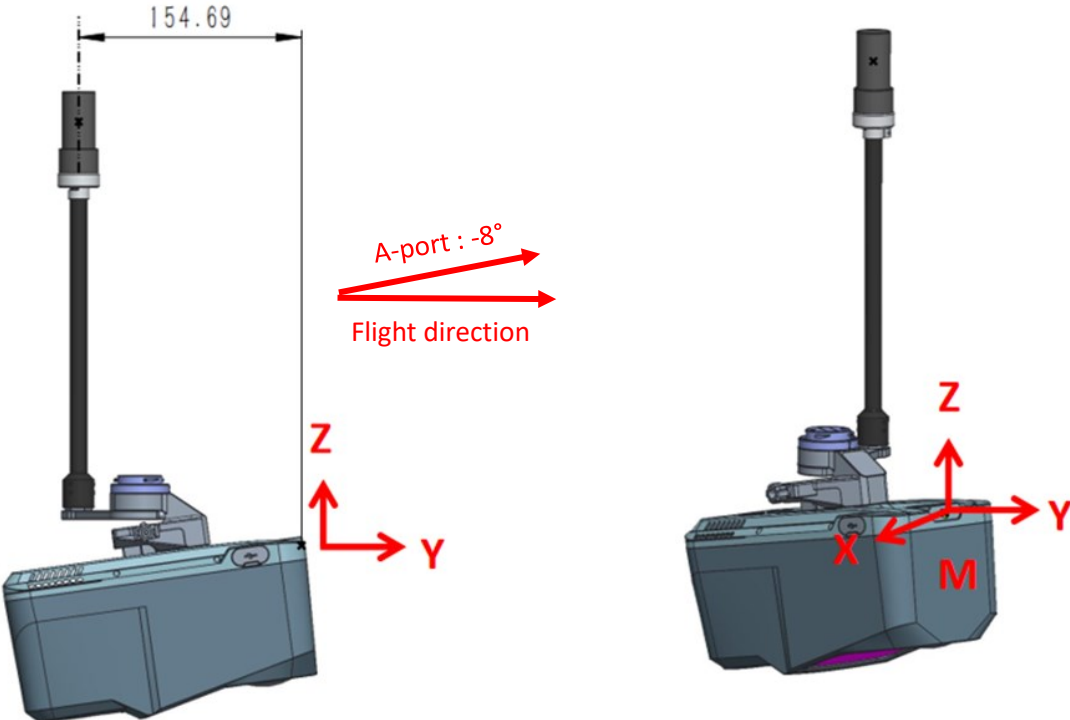
- Carrier Type: Select the original EP of the device.
- Carrier Name: Rename the new EP.
- Lever Arm Offset (Sensor Measurement Origin to Antenna Phase Center;Unit: meter): Need enter the values from original point M to antenna phase center.
- Installation Direction (Unit: degree): Flight direction to A-port direction (Same/Opposite): If the flight direction is the same direction as the Y-axis, select same.



- A-port to the horizontal direction rotation (Downward is positive, upward is negative). If the device has no angle, value is 0, as follow:



- A-port to the horizontal direction rotation(Downward is positive, upward is negative). If the device has angle, as follow, value is -8





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