

The gAirhawk Software 4.8 verision Operation Procedure One-Key Process Solution

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Note

1. One-Key Process solution

It means the all parameters are recorded in the LiDAR unit (Hardware) before Shipment, and the offset (The position of the Antenna to the position of LiDAR center, also called Lever Arm) should be fixed, then it supports One-Key Process solution.

When process the data, only add the Base data, POS data and LiDAR data(Camera folders if necessary) not input the parameter manually.

Of course we support One-Key Process firmware for the clients, just share us the parameter of offset (The clients use their designed mounting kit). Some type (shipped before Nov 2020) do not support One-Key Process.

2. The gAirhawk software (4.8 version) is combined trajectory processing and lidar data processing together in gAirhawk software, it is only for LiDAR System which support One-Key Process solution. If do not support One-Key Process solution, the trajectory processing should be in Shuttle software separately.

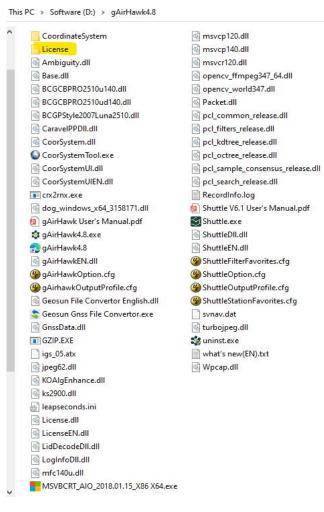
Please install the gAirhawk software at D/E/F drive, not C drive. Just in case it works in abnormally (In Window 10 system, user' full control should be get if install on C drive). Please copy and paste the license.dat file to the license folder which locate in the content of gAirhawk software.



Y

Software Installation

The following figure is the content of gAirhawk software after installation successfully.



Before running the gAirhawk software, please make sure the files (base data, POS data, lidar data and image folder if required) are ready.

Double click the gAirhawk icon on desktop, enter into the interface of operation, as following



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1. Create a New Project

Click the File icon, select New Project, enter into Create New Project interface, as following

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The file is named as the TEST, then click the Save icon (Save the file with the same location), enter into

Load data interface, as following

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	Coordinates: WGS	84
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Antenna I Antenna		

There are GNSS Base bar, GNSS Rover bar, Lidar File bar and Img bar (Only for the lidar system with Camera)

Click the GNSS Base bar enter into GNSS Base interface, click the Add bar to add the base data, as following



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Please input coordinates if base station coordinate required. Or select Approximate Coordinates.

Click the GNSS Rover bar enter into GNSS Rover interface, The Mode: there is drop-down menu, as following 6-2

ISS Base	GNSS Rover	Lidar Files	Img	
1ode:	GNSS differen			~
File Nam	GNSS differen The result of c POS input	tial data inpu outer GNSS ir	it iput	
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External (GNSS positionin	ig results		
POS file p	ath			

Hereby we only select the GNSS differential data input for One-Key Process solution. If select The result of outer GNSS input, only External GNSS Positioning results is available. If select POS input, only POS file path is available.

Click the Add bar to add the GNSS Rover data, as following



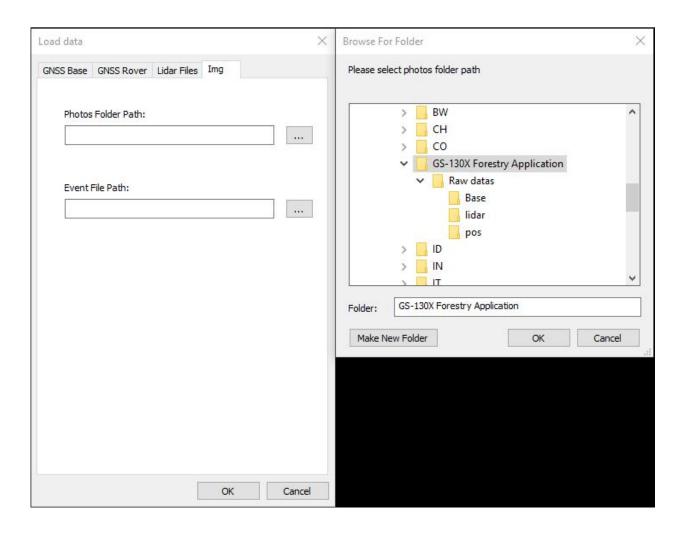
Mode: GNSS differential data input ~	Organize 🔻 New folder		== - 💷 📀
File Name	This PC Name	Date modified	Туре
	3D Objects	10/18/2021 7:02 AM	DAT File
	Desktop		
	😫 Documents		
< >>	🕹 Downloads		
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Antenna Height	E Pictures		
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	File name: 20211018064656.dat	✓ Geosun(*.k	qs);RINEX(*.**o);Dat
POS file path		Open	Cancel

Click the Lidar files bar enter into Lidar files interface, click the Add bar to add the lidar files, as following

Organize 👻 New fold	er		III 🔹 🛄	
This PC	Name	Date modified	Туре	
	(%) 20211018064645HES000.lid	10/18/2021 6:48 AM	LID File	
	@ 20211018064813HES001.lid	10/18/2021 6:49 AM	LID File	
	@ 20211018064942HES002.lid	10/18/2021 6:51 AM	LID File	
	(G) 20211018065111HES003.lid	10/18/2021 6:52 AM	LID File	
	@ 20211018065239HES004.lid	10/18/2021 6:54 AM	LID File	
J Music	20211018065408HES005.lid	10/18/2021 6:55 AM	LID File	
E Pictures	② 20211018065536HES006.lid	10/18/2021 6:57 AM	LID File	
📑 Videos	@ 20211018065705HES007.lid	10/18/2021 6:58 AM	LID File	
🏪 Local Disk (C:)	20211018065834HES008.lid	10/18/2021 7:00 AM	LID File	
Software (D:)	20211018070002HES009.lid	10/18/2021 7:01 AM	LID File	
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> Entertaiment (F:) >	<			
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Click the Img bar enter into Img interface, click the checking box to load the Photos Folder Path, as following (If the LiDAR System is with Camera)





In this step, no need to load Event File Path (Only for One-Key Process solution)

Click the OK bar, finish Adding files, as following (7-1)

After processing data and color point cloud output, if mismatch happens(image and point cloud), please delete the first photo from the beginning whatever the number of trigger event and the photos is.



😫 gAirHawk4.8-D:\Ti	est\GS-130X Forestry	Application\Raw datas\TEST.lip				- 1	5 X
File Data View							
File	× •		Lidar				
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2. Set the Coordinate System

Click the Tools bar, select Coordinate System, enter into Coordinate System Conversion Tool interface,

Click the , Create new coordinate system, name as WGS 84 (For example), click the OK icon, enter into Coor Config interface,

There are Translate bar, Parameter bar and Ellipsoid bar

In this step, only click the Ellipsoid bar to set the parameter, as following,

Coordinate system conversion tool —	Coordinate system conve	rsion tool	– 🗆 X	Coordinate system conver	sion tool	- ×
Tool About	Tool About			Tool About		
Coor Config WGS84	Coor Config WGS84	~		Coor Config WGS84	~	
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	dY(m)	0.0000		Source Ellipsoid Pro	jection	16
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Э	Target Ellipsoid Proj	jec <mark>t</mark> ion		6		Save a	is defau	lt	
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click the OK bar to save setting.

In this step, the local coordinate system is available according to the clients requirements. If not familiar with setting, please check the local surveyor or consult engineers.

3. Set the Parameter

FOV : 30-150 (According to Recommendation) Distance : 5-200M (According to flight height) Intensity: 0-255 Echo : Two Echos (Two and Triple Echos are available)

Lidar			_		
FOV:	30			150	deg
Distance:	5		[200	m
Intensity:	0			255]
Echo:	Two	e Echo		~	1
POS		(m.			
Coor. Sys	tem:	ENU		~	
Coordinate					
Coor. Sys	tem:	WGS84		~	
Coor, For	mat:	ENH		~	

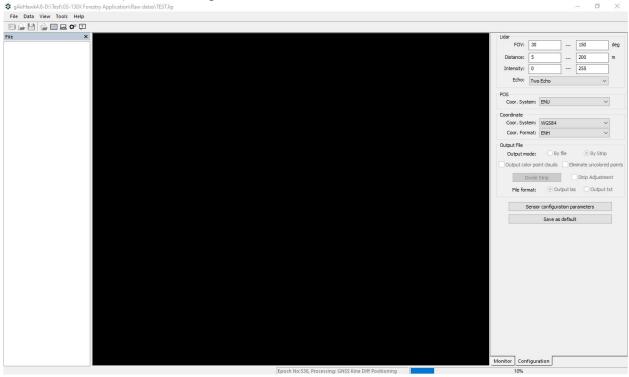


Then select POS (ENU, NED) ENU is default. Coordinate system and Format (ENH, XYZ(ECEF), BLH (DMS) and BLH (Degree) are available according to the requirement.

Output file Output mode By file or By Strip File format By Output Las or Output txt (According to the clients' requirement)

Output color point clouds is selected only for the LiDAR system with Camera. Eliminate uncolored points is selected means the point cloud without color will be eliminated.

If select Output mode By strip, the data processing start automatically (File partition, Kinematic Differential GNSS), as following

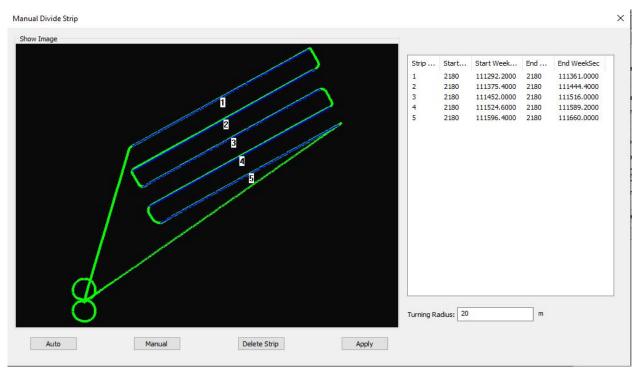


Then the trajectory dialogue pop up (Or Click the Divide Strip Bar), as following

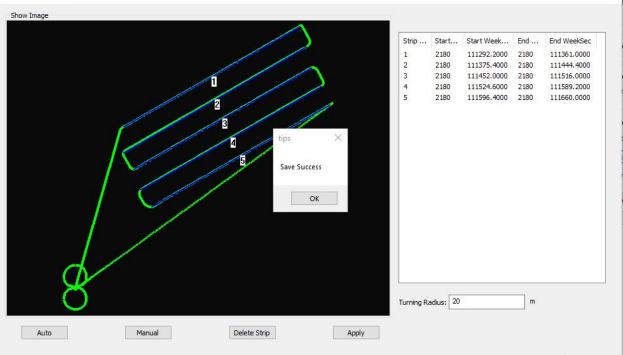


Manual Divide Strip					×
Show Image	Strip	Start	Start Week	End	End WeekSec
8	Turning Ra	dius: 20		m	
Auto Manual Delete Strip Apply					

Enter into Manual Divide Strip interface, click the Manual bar to choose the strips (the client could choose the strips according to requirements, and only straight strips are chosen, removed radius parts) Click the strip from the start to the end with left click (Mouse, not holding the mouse) to finish selecting one strip, re-peat this step to select all the strips you required. As following

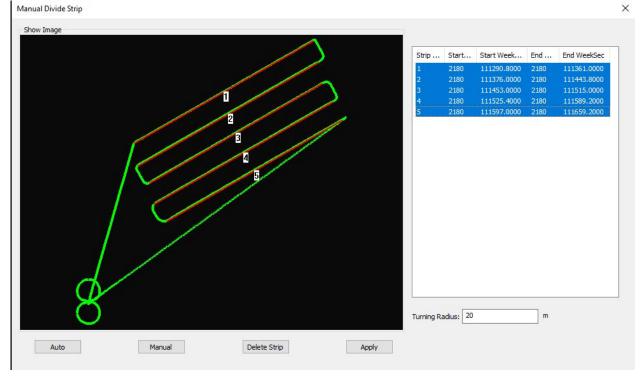






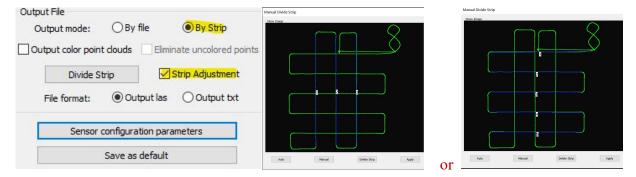
Click the Apply bar, to Save success. Then select OK bar to finish Manual Divide Strip, as following $$_{\rm Manual Divide Strip}$$

If you want to delete the strips or re-select the strips, just select the strips on right (strip 1,2,3,4,5) Then click the Delete Strip bar, it is done as following





When select Strip Adjustment function, the strips are only selected from North to South (South to North) or from East to West (West to East), but not full strips.



Click the Sensor Configuration Parameter bar to view the parameter (When add the lidar and camera files), the system will read these parameter automatically. As following

Sensor configuration	Paramet	ers		×	Lidar					
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Lidar Camera					Distance:	5			200] m
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	x	90.0000000	deg		POS					-2 -2
	Y	0.000000			Coor. Sys	tem: E	ENU		~	·
					Coordinate	1				
	Z	-90.0000000	deg		Coor. Sys	tem: \	NGS84		~	•
	Leve	r Arm from Lidar to b' (meas	sured in b')		Coor. For	mat: E	ENH		~	
	x	0.0352000	m		Output File		~		~	
	Y	0.0703000	m		Output m		⊖By fi		By Strip	
	z	-0.0047000	m		Output col				ninate uncolore	
	Misali	ignment Angle from b' to b	(Z->Y->X)		C	ivide St	trip		Strip Adjustme	ent
	x	-0.0500000	deg		File for	mat:	 Output 	out las	G Output	txt
	Y	-1.0500000	deg			Sensor (configurat	ion pa	rameters	1
	z	-0.1300000	deg				Save as c	lefault	t	-
		-			0				.0	
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			Ok	Crimit						
			UK	Cancel						



sor configu	uration Parameters				×	Lidar					
isor coninga					~~~	FOV:	30]	150	deg
dar Came	era					Distance:	5]	200	m
Device:	SONY A6000	~				Intensity:	0			255	1
Parameter		_	Rev	volving Angel from Camera	to b'(Z->Y->X)	Echo:	Two	Echo	10	~	1
Focal:	15.8271000	mm	х	0.000000	deg		100	LUIO			
Pixel Size:	0.0039170	mm	v	0.0000000		POS	ana l				al '
Image Size:	6000 x 4000	pix	Y	0.000000	deg	Coor. Sys	tem:	ENU		~	
Exposure	0.0043290	s	Z	0.000000	deg	Coordinate					al l
		5				Coor, Sys		WGS84		~	
Principal poin		_	Lev	er Arm from Camera to b'(measured in b')	Coor. For	mat:	ENH		~	
x0: 0.105	59700		х	0.0390000	m	Output File					
y0: 0.203	38580		Y	-0.0540000	m	Output m	ode:	⊖Ву	file	By Strip	
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	574256675382502163	3	Y	-0.9900000	deg			Save as	derau	t.	

4. Point Cloud Calculation

Click the Data Bar, select Point Cloud Calculation to start to process the data. The progress bar is movement. As following



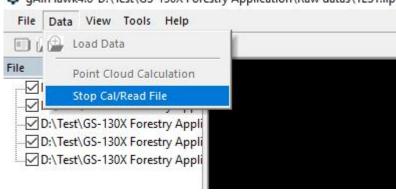


🔹 gAirHawk4.8-D:\Test\GS-130X Forestry Application\Raw datas\TEST.lip			- 0 ×
File Data View Tools Help			
File Data View Tools Help		Dest Inter POS Coord Coord Coord Coord Output Outpu	FOV: 30 150 deg ance: 5 200 m nstly: 0 255 Echo: Two Echo x. System: BNU x. System: WGS84 x. System: WGS84 x. System: WH
< >>		Monitor	Configuration
	Epoch No:72240, Processing: GNSS/INS Integration		36%

Firstly it does the GNSS/INS integration process, then process the LiDAR data.

During processing, forward & backward the roller of mouse to zoom in/out, the point clouds display strip by strip.

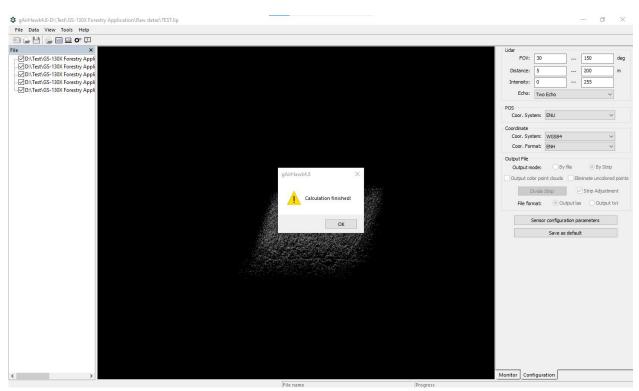
It could stop when you click the Stop Cal/Read File bar if required.



🔹 gAirHawk4.8-D:\Test\GS-130X Forestry Application\Raw datas\TEST.lip

After processing, the progress bar stops and display Calculation finished! . As following (12-1)





Click the OK.

Check the LAS files in original files.

Name	Date modified	Туре	Size	
20211018064645HES000.lid	10/18/2021 6:48 AM	LID File	219,376 KB	
@ 20211018064813HES001.lid	10/18/2021 6:49 AM	LID File	219,376 KB	
@ 20211018064942HES002.lid	10/18/2021 6:51 AM	LID File	219,376 KB	
@ 20211018065111HES003.lid	10/18/2021 6:52 AM	LID File	219,376 KB	
@ 20211018065239HES004.lid	10/18/2021 6:54 AM	LID File	219,376 KB	
@ 20211018065408HES005.lid	10/18/2021 6:55 AM	LID File	219,376 KB	
(20211018065536HES006.lid	10/18/2021 6:57 AM	LID File	219,376 KB	
@ 20211018065705HES007.lid	10/18/2021 6:58 AM	LID File	219,376 KB	
@ 20211018065834HES008.lid	10/18/2021 7:00 AM	LID File	219,376 KB	
@ 20211018070002HES009.lid	10/18/2021 7:01 AM	LID File	219,376 KB	
@ 20211018070132HES010.lid	10/18/2021 7:02 AM	LID File	168,751 KB	
TESTHESLine001.las	10/29/2021 2:25 PM	LAS Laser Point File	451,690 KB	
TESTHESLine002.las	10/29/2021 2:25 PM	LAS Laser Point File	446,688 KB	
TESTHESLine003.las	10/29/2021 2:25 PM	LAS Laser Point File	405,823 KB	
TESTHESLine004.las	10/29/2021 2:25 PM	LAS Laser Point File	415,265 KB	
TESTHESLine005.las	10/29/2021 2:25 PM	LAS Laser Point File	391,339 KB	

Click the Save bar to save this project.



Note: The data displayed in gAirhawk is 0.1% of total number of point clouds. Please review the LAS files and do the next procedure by 3rd party software (Cloudcompare, Terrasolid and QTM).