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.

Software Installation

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

Y

This PC > Software (D:) > gAirHawk4.8



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



1. Create a New Project

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

😫 Creat New Project							\times
← → ~ ↑	« Tes	t > GS-130X Forestry Application	~	õ	, Search	GS-130X Forestry	Ар
Organize 🔻 Ne	w folde	r					•
 Documents Downloads Music Pictures Videos Local Disk (C: Software (D:) Documents (I Entertaiment) E:) (F:)	Name	1	Date moi	dified 21 9:18 AM	Type File folder	
LANBOOXIE ((H:) ~	٢					>
File name:	TEST						~
Save as type:	Lidar P	roject(*.lip)					~
∧ Hide Folders					Save	Cancel	

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

INSS Base	GNSS Rover Lidar Files Im	ig 👘
File Name		
<		3
	Add	Remove
OInput	Coordinates (Approx Coordinates: WGS84	imate Coordinates
Latitude	-	Input XYZ
Longitude	۲. <u> </u>	Favorites
Flevation	(m) dms	Add to Favorites
LIEVAUUT		
Antenna I	Height	
Antenna I Antenna	Height 9 Height:	(m)
Antenna I Antenna	Height 3 Height: Slope Antenna Radius:	(m)

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

ad data	open						
ISS Base GNSS Rover Lidar Files Img	← → ·	🕆 🛧 « Raw datas » Base		5 v	P Search	n Base	
File Name	Organize	 New folder 				822 *	
	E Des	ktop ^ Name	^	Date mod	dified	Туре	
		cuments 🛞 els.kqs				KQS File	
C	> Mu	sic					
Add Remove	Pict	tures					
Coordinates O Input Coordinates O Approximate Coordin	ates Vid	eos					
Coordinates: WGS84	Sof	al Disk (C:)					
Latituda Turcuk	Doc	cuments (E:)					
Longitude	ites Ent	ertaiment (F:)					
Elevation (m) dms Add to Fa	avorites	NBOOXIE (H:)					
Antenna Height	LANE	300XIE (H:) V <			·		
Antenna Height:	(m)	File name: els.kqs		~	Geosun(*.k	qs);RINEX(*.*	**o)
Use Slope Antenna Radius:	(m)				Open		Cancel
Phase centre: 0	(m)						
	GNSS Base GNS	SS Rover Lidar Files In	ng	×			
	GNSS Base GNS File Name D:\Test\GS-13	SS Rover Lidar Files In DX Forestry Application \R	ng aw datas\βase\els	.kqs			
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	Coordinates	SS Rover Lidar Files In DX Forestry Application \R Add	ng aw datas\Base\els. Remove	.kqs			
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	Load data GNSS Base GNS File Name D:\Test\GS-13 Coordinates O Input Coor Latitude 0	SS Rover Lidar Files In DX Forestry Application \R Add dinates (Approx bordinates: WGS84	ng aw datas\Base\els. Remove kimate Coordinates	.kqs			
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Please input coordinates if base station coordinate required. Or select Approximate Coordinates. Cancel

ОК

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

VSS Base	GNSS Rover	dar Files In	ng	
ode:	GNSS differential	data input		~
File Nam	CNSS differential The result of out POS input	data input er GNSS inpu	ţ	
<				>
	Add		Remove	
Antenna	a Height			
Antenr	ıa	0		(m)
Use	Slope Ante	nna Radius:	0	(m)
External	GNSS positioning r	esults		

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

lode: GNSS differential data input	Organize 👻 New folder		()
File Name	This PC Name	Date modified Type	
	3D Objects 20211018064656.dat	10/18/2021 7:02 AM DAT File	
	Desktop		
	Documents		
c			
Add Remove	👌 Music		
Antenna Height	E Pictures		
Antenna 0 (m)	Videos		
	Local Disk (C:)		
Use Slope Antenna Radius: 0 (m)	Software (D:)		
external CNES positioning regults	Documents (E:)		
xternal and 3 positioning results	Entertaiment (F:) 🗸 <		
	File name: 20211018064656.dat	Geosun(*.kqs);RINEX(*.**o);D	at \sim
OS file path		Open Cance	el

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

	Organize 👻 New folder				-	
File Name	This PC	Name	Date modif	ed	Туре	
	3D Objects	@ 20211018064645HES000.lid	10/18/2021	6:48 AM	LID File	
	Deskton	@ 20211018064813HES001.lid	10/18/2021	6:49 AM	LID File	
		(9) 20211018064942HES002.lid	10/18/2021	6:51 AM	LID File	
	Documents	(9) 20211018065111HES003.lid	10/18/2021	6:52 AM	LID File	
	- Downloads	(9) 20211018065239HES004.lid	10/18/2021	6:54 AM	LID File	
	J Music	20211018065408HES005.lid	10/18/2021	6:55 AM	LID File	
	E Pictures	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:)	(Galacian States) 20211018070002HES009.lid	10/18/2021	7:01 AM	LID File	
	Documents (E:)	20211018070132HES010.lid	10/18/2021	7:02 AM	LID File	
<	> Entertaiment (F:) >	<				
() <u></u>	File nar	me: 20211018070132HES010.lid" "202110	18064645HES00 ~	(.lid) (*.lid)		
Add Delete		- W-		0	0	

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:\Test\GS-130X Forestry Application\Raw datas\TEST.lip	1. EE	- 0 ×
File Data View Tools Help		
File ×		Lidar
D:\Test\GS-130X Forestry Appli		FOV: 30 150 deg
D:\Test\GS-130X Forestry Appli		Distance: 5 200 m
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D:\Test\GS-130X Forestry Appli		court system into
D:\Test\GS-130X Forestry Appli		Coordinate
D:\Test\GS-130X Forestry Appli		Coor. System: Default ~
		Coor. Format: ENH V
		Output File
		Output mode: By file OBy Strip
		Output color point double
		Divide Strip Strip Adjustment
		File format: Output las Output txt
		Sensor configuration parameters
		Save as default
< >		Monitor Configuration
	File name	Progress

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,

Tool About Tool About Tool About Tool About Coor Config WGS84 Co	×
Coor Config W3884 Coor Config Coor Config W3884 Coor Config W3884 Coor Config Coor Config W3884 Coor Config Coor Config W3884 Coor Config W3884 Coor Config Coor Config Coor Config W3884 Coor Config Coor	
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Source Coordinate	•
Format BLH (D) 0.00000000000000000000000000000000000	v
Format BLH (D) CRotation(s) 0.000000000 Projection Model transverseMercator B(D) 0.000000000 Scale 1.0000000000 Central Meridan(D) 11.000000000 H 0.000000000 Model Move Fitting Parameteri Ociono0000 Target Coordinate Format ENU ENU Format ENU Projection Model transverseMercator N N Ociono000000 False Northing(m) 0.000 False Northing(m) 0.000	16
B(D) 0.000000000 Height Paramter Original Lattude(O) 0.0000000000 Original Lattude(O) 0.0000000000 False Easting(m) 0.000000000 False Easting(m) F	•
Bigling 0x00000000 0x00000000 False 0x00000000 False 0x00000000 False 50000.000 False False </td <td></td>	
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Laic Parameter	

Coordinate system conver-	sion tool	- D	×	Lidar					
Tool About			2/2/	FOV:	30]	150	deg
ioon About				Distance:	5]	200	m
Coor Config WGS84	~			Intensity:	0		1	255	Í
Translate Paramter El	lipsoid			Echor	Ture	r.L.]		1
			tvance	Echor	TWO	ECHO			
			avance	POS					-
Source Ellipsoid Par	ameters			Coor. Syst	tem:	ENU			1
Data sources	Source Ellipsoid		•	Coordinate					
Source Ellipsoid	WGS84		v	Coor. Syst	tem:	WGS84			-
Source Ellipsoid Pro	jection		1	Coor. For	nat:	ENH		,	1
Projection Model	transverseMercator	Information X	•	Outeut Eile					-
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Target Ellipsoid Para	Target Ellipsoid Parameters					configura	ation na	arameters	-1
Ellipsoid Name	WGS84				icriso(connigare	ruon pe	a diffic der 5	
Target Ellipsoid Prog	jec <mark>tion</mark>		6			Save as	defaul	t	
Projection Model	transverseMercator		•						
Central Meridian(D)	114.00000000000								
Original Latitude(D)	0.00000000000								
False Easting(m)	50000.000								
False Northing(m)	0.000								
Scale factor	1.000000000								
Use zone number	Not Use	Not Use							
5									

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 Geosun' 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)

Liudi			_		
FOV:	30			150	deg
Distance:	5		[200	m
Intensity:	0			255	
Echo:	Two	o Echo		~	
POS		11-			
POS Coor. Sys	tem:	ENU		~	
POS Coor. Sys Coordinate	tem:	ENU		~	
POS Coor. Sys Coordinate Coor. Sys	tem: tem:	ENU WGS84	5	~]

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



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 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 Parameters			Lidar				
			FOV:	30		150	deg
Lidar Camera			Distance:	5	[200	m
D	evice model: GS-130X	~	Intensity:	0	[255	
	Revolving Angle from Lidar to b' (7->)	(-5X) —	Echo:	Two Echo		~	
	x 90.0000000	dea	POS	<u>17</u>			
	× 0.000000		Coor, Sys	tem: ENU		~	
	1 0.000000	aeg	Coordinate				
	Z -90.000000	deg	Coor, Sys	tem: WGS84		~	
	Lever Arm from Lidar to b' (measured	in b')	Coor. For	mat: ENH		~	
	χ 0.0352000	m	Output File				
	y 0.0703000	m	Output m	ode: OBy f	file	By Strip	
	Z -0.0047000	m	Output col	or point clouds	Elimi	inate uncolored	points
	Misalignment Angle from b' to b (Z->Y	->X)	D)ivide Strip	\square	Strip Adjustme	nt
	X -0.0500000	deg	File for	mat: 💿 Out	put las	Output t	xt
	Y -1.0500000	_ deg	Sensor configuration parameters				
	z -0.1300000	deg		Save as	default		
	10-10-10-10-10-10-10-10-10-10-10-10-10-1			5070 05	acroan		-
	Time compensation: 0	S					
		Oh Orrel					
		UK Cancel					

sor configuration Pa	rameters			×	Lidar				
ison configuration i a	in the cost of the				FOV:	30		150	de
idar Camera					Distance:	5		200	m
Device: SONY A	6000	~			Intensity:	0		255	
Parameter		Re	volving Angel from Camer	a to b'(Z->Y->X)	Echo:	Two Echo		L	~
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Image Size: 6000	х 4000 р	ix			C001. 593				
Exposure 0.00432	290 s	Z	0.000000	deg	Coor Syst	tem: WCS	24		~
Principal point					Coor For	mat: ENH	-		~
x0: 0.1059700		Le	ver Arm from Camera to b	(measured in b')					
		V	0.000000		Output File				
v0· 0.2038580		j ^	0.0390000	m	Output m	odou C) By file	By	Strin
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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



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

File Data View Tools Help		
File ×	Lidar FOY: 30 Detance: 5 Intensity: 0 Echo: Two Echo POS Coor System: ENJ Coordinate Coor, Fornat: ENH Output File Output Inde: 0 Output rolder ont doud Divide Strip File format: 0 Sensor config Save	y file: OBy Strip Strip Adjustment Strip Adjustment Support lass Output tot ration parameters as default
	Monitor Configuration	

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.

Thi	s PC > Software (D:) > Test > GS-130X	Forestry Application > Raw dat	as > lidar	~ ē	🔎 Search lidar
^	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	
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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).