GeoCue
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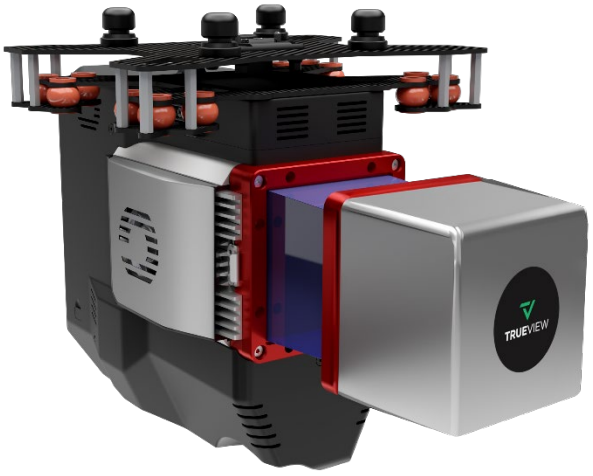
Version 1.0

TrueView 625 Hardware User Guide



Version Compatible with LP360 version 2022.1.48 and newer.
Updated for firmware v2.0.0-4

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ABOUT GEOCUE

GeoCue was founded in 2003 by a group of engineers with extensive experience in developing hardware and software solutions for primary remote-sensed data acquisition. Our initial products were aimed at reducing schedule and cost risk in geospatial production workflows by providing organizational, productivity and data management tools for base geospatial data production. These tools have been realized as the GeoCue product family. Today GeoCue workflow management tools are used by a majority of North American geospatial production shops. In 2005, GeoCue began selling and supporting Terrasolid tools for kinematic LiDAR data production. This was followed in 2009 by our acquisition of QCoherent Software LLC, the creator of the point cloud exploitation toolset, LP360. Today GeoCue is the largest supplier of kinematic LiDAR processing tools in North America and LP360 is the world's most widely used tool for exploiting point cloud data. In 2014, GeoCue started a division focused on using small Unmanned Aerial Systems for high accuracy mapping. Leveraging our expertise in production, risk reduction, and point cloud processing tools, we are continuing to bring new services and products to market to provide surveyors and other geomatics professionals exciting tools for geospatial data extraction using low-cost drones including Loki, our plug-and-play PPK direct positioning system, and now our TrueView LiDAR/Imagery fusion (3DIS) sensors. To learn more, visit www.geocue.com.

ABOUT LP360 DRONE

LP360 is a 64-bit Windows® desktop application used for many years by the LP360 Geospatial community for processing traditional aerial, mobile, and terrestrial tripod laser scanner data. The LP360 Drone community is the focus of this Users Guide containing the LP360 workflows for processing and exploiting TrueView, Microdrones® and guest sensor drone data. Formerly called TrueView EVO, LP360 Drone, is GeoCue's LP360 point cloud exploitation product with the addition of a collection of tools and workflows for processing drone data. LP360 Drone is the software used to post-process your raw flight data to generate a 3D LiDAR point cloud in LAS format, colorize the point cloud, and geotag the images collected. LP360 also has many tools for assessing and processing point cloud data, such as accuracy assessment, automatic and manual ground classification, and contour/ surface generation. LP360 Drone is available in the following licensing levels:

- **LPViewer** – A free viewer level of LP360 for viewing a point cloud.
- **TrueView EVO/LP360 Drone Explorer** – A low-cost inspector license equivalent to LP360 Viewer, with Image Explorer enabled for viewing True Pose® photos, and Import TrueView Cycle for field QC checks. This is also the license that should be purchased for delivery with LP360 Explorer Packages provided to end users so they can make full use of the TrueView 3DIS point cloud and photos, plus any derivative products you generate for them.
- **LP360 Drone** – Enables PPK processing for guest systems, such as the DJI P4RTK plus TrueView 2DIS and 3DIS. This is the next generation ASPSuite Advanced and is equivalent to LP360 Standard with the addition of the TrueView workflow tools and tools for ground classification and volumetric computations. It is limited to product areas of no more than 10 km² of LAS data. Available as an annual subscription or a perpetual license.
- **LP360 Drone+Fast Photo** – Enables local Fast Orthomapping at a lower resolution, local Orthomapping processing if you have your own Metashape license, and Cloud based Orthomapping (using TrueView points). Available as an annual subscription or a perpetual license.
- **LP360 Drone+Cloud Photo 3000** – Enables local Fast Orthomapping, local Orthomapping processing if you have your own Metashape license, and Cloud based Orthomapping (includes 3000 photos per month, additional photos may be processed using TrueView points). Available as an annual subscription or a perpetual license.
- **LP360 Drone+Strip Align** – Enables Strip Align tools for adjusting for dynamic trajectory errors in the dataset. Available as an annual subscription or a perpetual license.
- **LP360 Drone+Business Intelligence Tools** – Enables specific point cloud tasks designed for extraction of non-ground features, such as rail, power lines, buildings, trees. Available as an annual subscription or a perpetual license.
- **LP360 Drone+Unlimited** – this is the same functionally as LP360 Drone with the size limit removed. Available as an annual subscription or a perpetual license.

The legacy TrueView EVO license levels are:

- **TrueView EVO, formerly named TrueView EVO Lite** – Enables PPK processing for guest systems, such as the DJI P4RTK. This is the next generation ASPSuite Advanced and is equivalent to LP360 Advanced with the addition of the TrueView workflow tools. It is limited to product areas of no more than 10 km² of LAS data.

- **TrueView EVO 3DIS, formerly named TrueView EVO** – This is equivalent to LP360 Advanced with the addition of the TrueView workflow tools. It is limited to product areas of no more than 10 km² of LAS data.
- **TrueView EVO Unlimited** – this is the same functionally as TrueView EVO with the size limit removed. Available as an annual subscription.

ABOUT TRUEVIEW RECKON

TrueView Reckon is an Amazon Web Services (AWS) hosted platform that is used for a variety of purposes in TrueView (and other) workflows. It provides services such as (items marked with a $T are extra cost, paid in TrueView Points):

- Project data hosting and visualization ($T)
- Data archival ($T)
- Management and automatic delivery of sensor calibration files
- Automatic sensor health check
- Transfer of sensor Cycle data to GeoCue for technical support
- Management of TrueView Points for services that are paid via a metering scheme (marked in this list with $T)
- Transaction history of sensor usage
- other related services

TrueView Reckon is accessed from within LP360 Drone in various workflows. These workflows might require an LP360 Drone user to provide their Reckon login credentials. TrueView Reckon also has a web interface for data visualization and account monitoring.

Every customer with a TrueView or guest sensor (whether purchased or a rental) is provided a Reckon account.

A TRUEVIEW CYCLE

All TrueView sensors, and Microdrones sensors running the latest firmware, write their various data streams to a standard file folder structure called a "Cycle" on the UMS (UMS Mass Storage). The original meaning of *cycle* was an on/off cycle of the sensor. It is possible to have multiple collections (flights, in the case of a drone) in a single Cycle, so it is not necessarily correct to think of Cycle as being synonymous with flight, though it is typically.

FCC AND IC COMPLIANCE

This device complies with Part 15 of the FCC Rules and Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Parts used in the construction of this device may contain radio components or functionality. The parts were selected based upon availability and are compliant with FCC and Industry Canada rules and standard(s). Compliance statements and / or certification can be obtained within the manufactures' resources.

This device contains the following parts:

Component	Hardware Version ID no.	Product Marketing Name	Firmware Version ID no.	IC no.	FCC no.
Raspberry Pi-4 model B	Raspberry Pi,4 model B	Raspberry Pi,4 model B	n/a	20953-RPI4B	2ABCB-RPI4B
APPLANIX APX-15 /20	n/a	n/a	n/a	Please see Manufacturer Compliance Certificate	Please see Manufacturer Compliance Certificate
Riegl	SX SDMAN	SX-SDMAN	3.5.99.21	4908A-SDMAN2	N6C-SDMAN2

Table 1. Radio components in the TrueView 625 payload.

NOTICE TO USERS

Warnings

Read these warnings carefully before you use TrueView 625 payload series. Failure to do so can result in serious injury.

WARNING

Do not attempt to take apart, reassemble, or alter the TrueView 625 payload as it will void the warranty. Only qualified personnel can service the payload.

CAUTION

Do not disconnect the power from the drone/payload until the payload is fully powered **OFF**.

CAUTION

Do not expose the payload to rain or water.

CAUTION

This payload has an operation range of -10°C up to 50°C. Operation outside this temperature range can lead to damage to the payload.

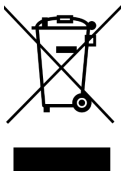
WARNING

This is a Class 1 laser and is not hazardous however, do not look directly at the laser light or direct it toward people at any time. The payload contains infrared lasers which are invisible to the human eye and can cause harmful exposure and injury.

WARNING

Do not block the cooling vents located on the right and left side of the payload. If you block the cooling vents the payload will become too hot.

Disposal



Do not put batteries or other electrical equipment into general waste containers. Substances in batteries are harmful to human health and the environment. Dispose of electrical equipment at a collection point or recycling center. Contact your local authority for detailed information.

TrueView 625 Payload System Items

Item	Quantity
TrueView 625 LiDAR	1
TrueView 625 travel case	1
32GB UMS flash drive (Only use the UMS flash drives provided by Microdrones) [1] [2]	1
AV18 GPS antenna	1
LiDAR calibration report	1
Lens cleaning kit	1
Debug cable	1

Table 2. List of system items.

[1] To purchase additional UMS flash drives please contact GeoCue Customer Support or your Sales Representative. Quote article number A004105.
[2] A 64GB version of the UMS flash drive is now also available please contact GeoCue Customer Support or your Sales Representative for more information.

TRUEVIEW 625 PAYLOAD SERIES PRODUCT SPECIFICATIONS

Model	TrueView 625
Article number – TrueView 625	A005660
Year of release	2023
Mass – TrueView 625	2400 g
Dimensions	320 x 185 x 216 mm

Table 3. TrueView 625 payload series product specifications.

Technical specifications of TrueView 625

Laser safety class	1
Field of view	Up to 216°
Scan speed	100 Hz
Scan angle	0.12°
Absolute vertical accuracy	± 1 to 5 cm
Absolute horizontal accuracy	± 1 to 3 cm
System operating temperature range	-10°C (14°F) up to 40°C (104°F)

Table 4. miniVUX-1UAV product specifications.

CAMERA PRODUCT SPECIFICATIONS

Type	Color camera
Imaging Device	3 x GeoCueMapping Camera (GMC) 20 MP
Type of Shutter	Mechanical
Camera Sensor Format	APS 3:2
Resolution (MegaPixels)	20
Pixels: H x V	5472 x 3648
Pixel Size: H x V (µm)	2.41
Sensing Area: H x V (mm)	13.2 x 8.80
Focal Length	10.6 mm
FOV (individual camera)	63.8°
FOV (Combined lateral view cameras)	120°

Table 5. TrueView 625 payload series camera product specifications.

TECHNICAL SPECIFICATIONS OF TRUEVIEW 625 PAYLOAD

Specification	Value
Data Collection	LiDAR + Imagery
LiDAR Scanner	RIEGL miniVUX1-IUAV
LiDAR Beams/Returns	Up to 5 per outgoing pulse
LiDAR Range – usable	100 m for targets with >20% reflectivity
Positioning and Orientation System	Applanix APX-15
Pulse Repetition Rate	Up to 100 kHz (selectable)
Scanner Performance	Precision: 10 mm Accuracy: 15 mm
System Performance	Precision observed on one Strip: Typical 20 mm, Less than 15 mm (1 sigma) observed at 75 m on concrete. Accuracy: Typical 3 cm RMSE, better than 5 cm 3D RMSE – depending on GNSS conditions, accuracy of control points and coordinate system.
GNSS/INS Performance	Position: 20-50 mm Angle: 0.025 degree Roll/pitch, 0.08 degree heading
Camera Sensor	3 Sony IMX-183: 1", 20 MP, RGB -> 60 MP per payload Optional upgrade to high-resolution Sony RX1R2 or Sony a7r. Contact sales for details.

Table 6. TrueView 625 payload series technical specifications.

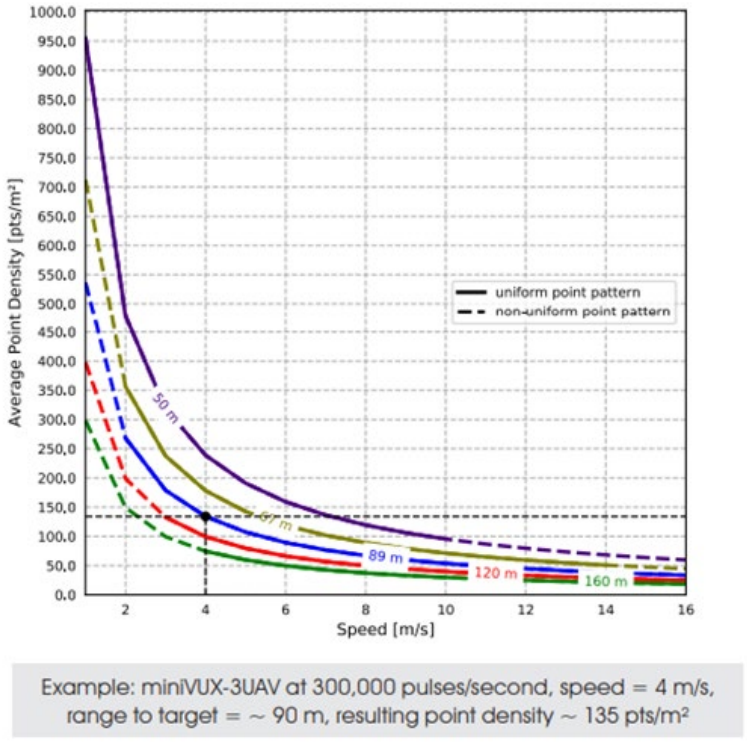


Figure 1. Density graph.

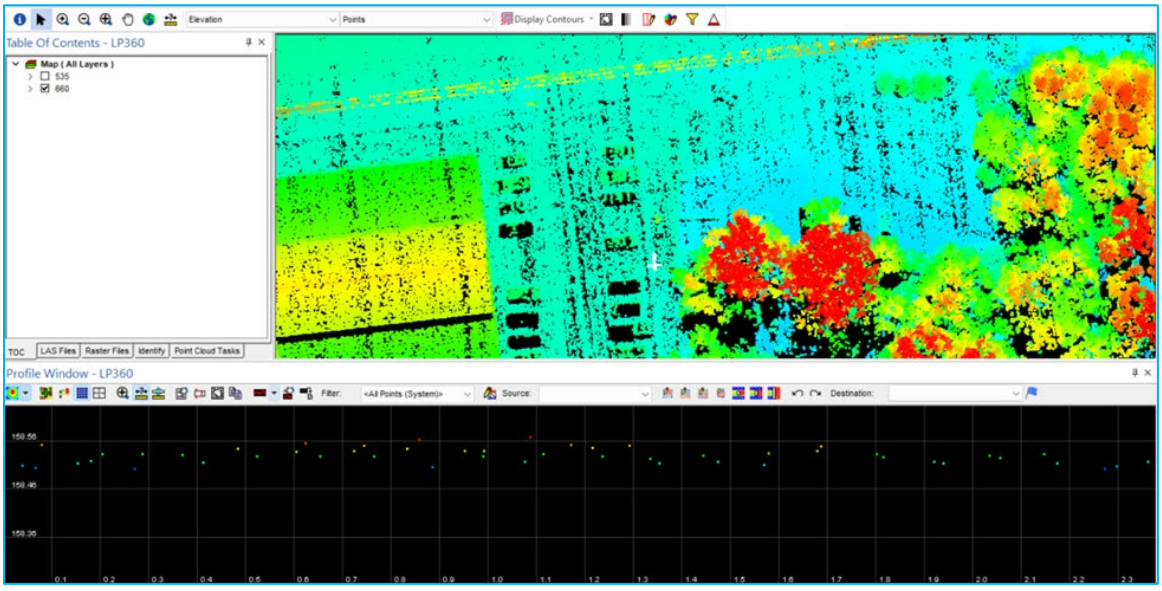


Figure 2. Example of precision.

SYSTEM DESCRIPTION

This section describes the TrueView 625 payload. It addresses how it works, how to set it up, and how to configure the system.

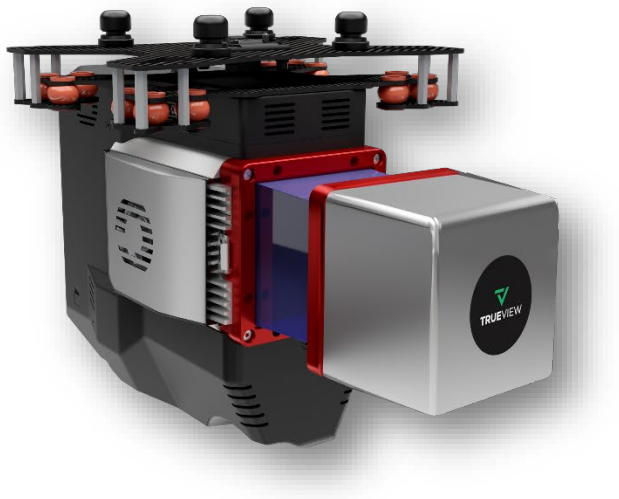


Figure 3. TrueView 625 payload.

TrueView 625 payload parts

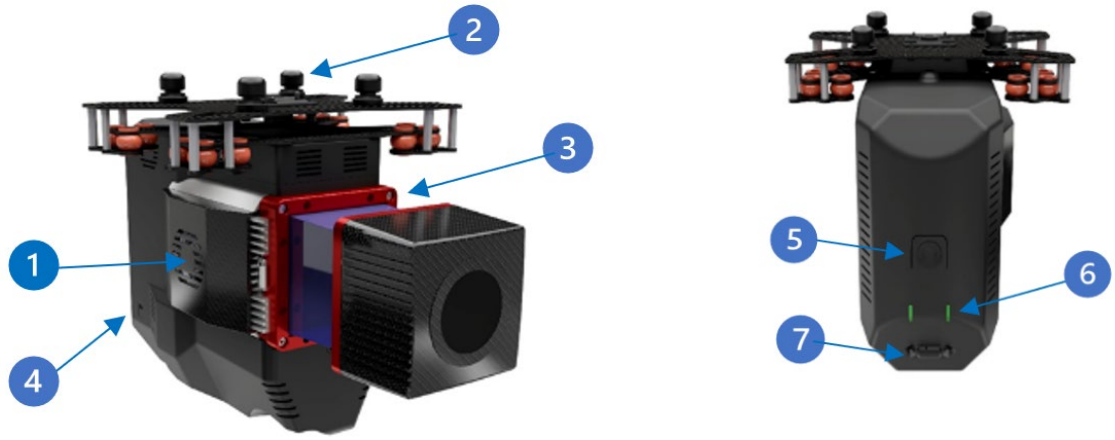


Figure 4. TrueView 655/660 payload parts.

1. Cooling vents (right and left side)	2. Payload interface
3. Scanner	4. Debug port
5. Multifunction button	6. LED lights
7. USB port	

Table 7. Explanation of TrueView 625 payload parts.

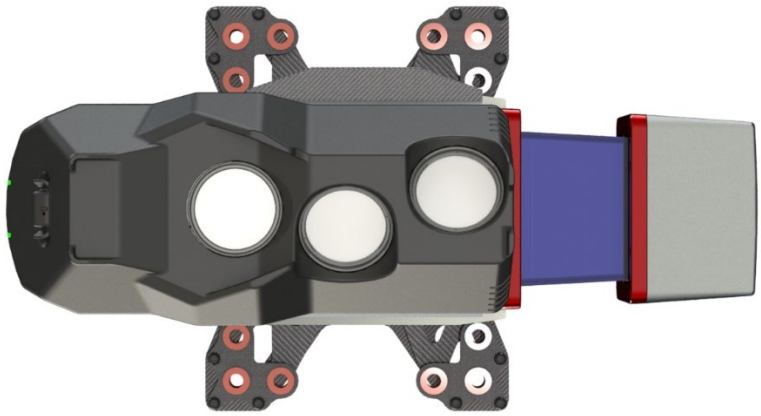


Figure 5. TrueView 655/660 payload three GeoCueMapping cameras.

USB port

The USB port is in the back of the payload. The storage device allows the user to retrieve data after the completed flight.

Figure 6. USB port located at the back of the payload.

UMS drive

The TrueView 625 payload includes one approved UMS drive with the capacity of 32GB flash storage that is proven to have a maximum transfer speed of the UMS 3 technology. It is important to only use Microdrones approved UMS drives to make sure the transfer speed is correct, and the data is collected.

FAT32 is the only supported file system for the TrueView 625 payload. If you need to clean or restore the UMS drive provided by Microdrones make sure it is formatted to FAT32, so the payload operates properly.

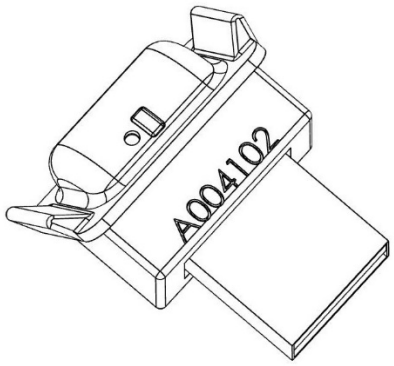


Figure 7. UMS drive.

WARNING

Back up your data after every flight. Always use a clean UMS drive for every flight to make sure sufficient space is available and the UMS drive is not corrupted.

Multifunction button

The multifunction button can be used to start/stop data collection or to abort an operation following the combinations below:

Button Press Type	Payload Reaction	LED Readout
Short press	Start data collection if payload is initialized (SYS LED is solid green).	SYS LED will switch to a slow blink green to indicate data collection started.
Long press (5 seconds)	Terminate and delete current data including log files. Note: This can be triggered at any state of the payload initialization.	SYS LED will fast blink yellow followed by solid white. Note: Once SYS is solid white payload can be turned OFF.
Short press (after collecting data started)	Switch to stop collecting phase and start downloading data to UMS.	SYS LED will switch to slow blink white followed by solid white or red error state. Note: Payload can be turned OFF once either solid white or error state SYS LED is on.

Table 8. Multifunction button instruction chart.

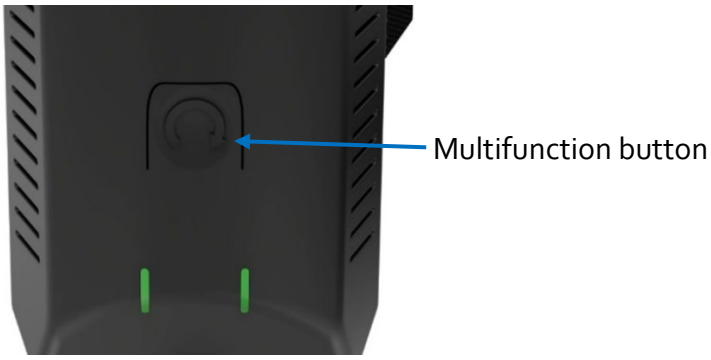


Figure 8. Multifunction button located at the bottom of the payload.

Debug port

The debug port is located on the rear left side of the payload. To access it remove the plastic cover. The debug port is used for service and advanced configuration of the TrueView 625 payload.

 WARNING	Do not modify or alter the debug port in any way unless instructed to do so by GeoCue Customer Support.

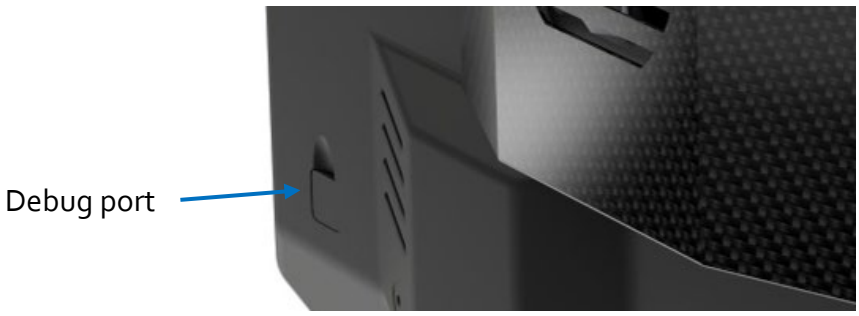


Figure 9. Debug port located at the bottom of the payload.

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Debug cable

The debug cable is a GeoCue approved accessory to use for service or advanced configuration of the TrueView 625 payload through the debug port.

Figure 10. TrueView 625 payload debug cable.

LED status lights

The LED status lights alert the user of the status messages that are in addition to status messages reported by mdCA.

Once the power is turned on, there are a total of two LED lights on the front of TrueView 625 to display the payload status.

Please refer to section **LED lights operation** for all status information.

Figure 11. LED status lights.

Table 10 shows all the lighting sequences, LED messages, and their meanings. Table 11 shows how to interpret the symbols in the table.

SYS	APX	LED Readout	Meaning
		No light	No power, or complete to download recording file from APX and turn off APX
		Slow blink	Turn on payload
		Fast blink	Initializing
		On - solid	Start APX (power on)
		Slow blink	APX is operating normally
		Fast blink	Enabling APX data recording
		Slow blink	APX setup is ready
		On – solid	Complete initialization and ready to fly
		Slow blink	In flight-collecting data
		Fast blink 1x	SII (drone error)
		Fast blink 2x	Camera error/off/not present
		Fast blink 3x	APX error
		Fast blink 4x	APX Application file error (not present or corrupted)
		Fast blink 5x	Storage error
		Fast blink	Stop collecting and start downloading data to UMS
		On – solid	Complete data download to UMS and prepare to turn system off
		Simultaneous fast blink	Firmware installation

Table 9. Status LED chart.

Step	Action
	Black circle with a white outline indicates the LED status light is OFF.
	Starburst of any color indicates the LED status light is blinking. Speed will be indicated by "fast blink" or "slow blink".
	Circle of any color other than black indicates the LED status light is solid.

Table 10. Status LED legend.

PROCEDURES

NOTE

The images shown in following section are to demonstrate the procedure only.

Attach the payload to the drone

Figure 12. Payload front (left), payload back (right).

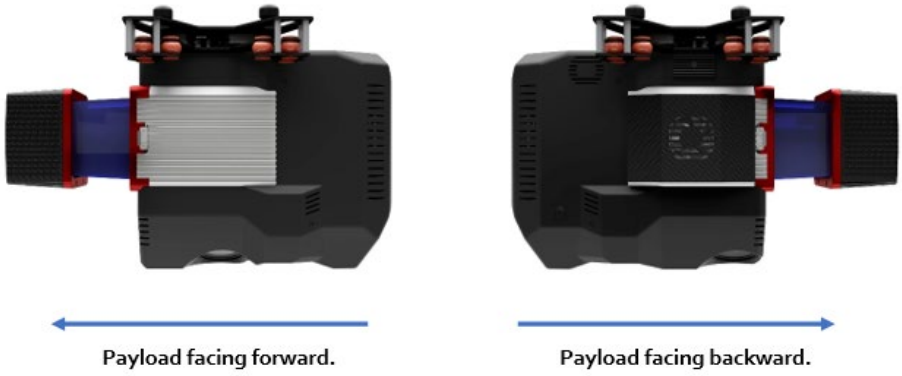

Figure 13. Side views. Payload facing front (left). Payload facing back (right).

The following steps summarize how to attach the payload to the drone:

1. Do a safety check to make sure the payload adapter clip is locked in the extended position.
2. Verify that the payload is oriented in the proper position (scanner lens facing the front of the drone). Do a visual inspection of the mating connectors on the payload and drone. Make sure the connectors on the payload and the drone are dry and free from any dirt or debris. Clean the connectors with dry compressed air if dirt or debris is present.

CAUTION	Do not connect the payload if the connector is damaged, or if dirt or debris cannot be removed. Damage to the payload or drone can occur. Contact GeoCue Customer Service for more assistance.

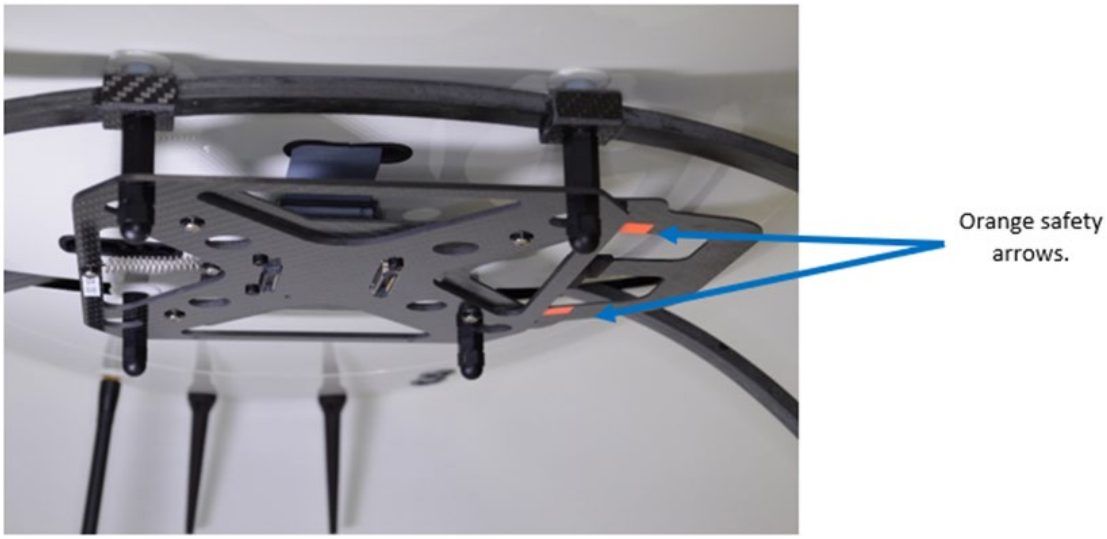

Figure 14. Orange safety arrows on the payload adapter clip (open position).

3. Align the front of the payload with the front of the drone. See Figure 7-1 for front orientation.
4. Push the payload up into the adapter slot. Make sure all four connectors are flush with the mount.
5. Push the payload clip up to release the lock plate. Make sure to hold the payload while the plate moves into position.

Figure 15. Release the adapter clip.

6. Make sure the locking mechanism is fully engaged. The locking mechanism is engaged if you cannot see the orange safety arrows on the lock plate.

Figure 16. Make sure the payload clips are in the fully extended position. Confirm that there are no orange arrows showing on the adapter clip.

CAUTION

If the locking mechanism does not fully engage, remove, and reattach the payload. Light pressure can be applied to the payload and the lock plate to help engage the locking mechanism.

CAUTION

Always hold the payload until the locking mechanism is fully engaged. Do not release the payload until a visual inspection is complete. Severe damage to the payload may occur.

Release the payload from the drone

To release the payload from the drone:

1. Hold the payload with one hand.
2. Push up on the payload clip and pull the lock plate out into the extended position.
3. Lower the payload from the mount.

Figure 17. Release the payload adapter clip.

CAUTION

Before releasing a payload to attach another payload make sure that the drone and the payload are fully powered **OFF**.

ADDITIONAL PAYLOAD OPERATION

Cleaning

As with most optical surfaces, minimal cleaning is the best practice. Any contamination, dust, or debris on the scanner optical surfaces can cause the laser light to diffuse or weaken. This will result in poor data collection. Fingerprints or debris on the camera lens can cause image quality loss. Whenever using cleaning liquids, apply to the cloth first and not directly to the lens.

CAUTION

The scanner window can be cleaned with a soft lint free cloth and acetone. Do not use isopropyl alcohol.

Scanner window

The scanner window can be cleaned with a soft lint free cotton cloth and acetone. Do not use isopropyl alcohol.

Camera lens

The camera lens can be cleaned with a camera lens cloth and lens cleaner. Do not use acetone as it can damage the plastic.

Payload

The body of the payload can be cleaned with a soft lint free cotton cloth and water. Do not use acetone as it can damage the plastic.

If there is a scratch or scuff on the painted surfaces of the body, you can use isopropyl alcohol or automotive wax to try to remove the mark. Be careful as the paint can get scratched.

PLI and connectors

The connector on the top of the payload, on the payload adapter on the drone may need cleaning. It is recommended to clean these connections with only compressed air.

Figure 18. PLI and connectors.

Scanner and camera lens/sensor care

When the payload is not being used, it is recommended to install the scanner and camera lens covers. Do not leave the scanner or camera pointing directly towards the sun. This can cause damage to the sensors. This is more important if the lens covers are not installed. For this situation put the payload back into the transportation case.

System Configuration File (SCF)

The System Configuration file (SCF), SystemConfiguration.json, must reside on the TrueView USB Mass Storage and is copied into the Cycle\System folder upon creation of each Cycle. The SCF contains information on the calibration parameters of all components for each TrueView system and is used by TrueView EVO to process TrueView data. The latest calibration file for each sensor is stored on the TrueView Reckon portal.

WEB USER INTERFACE (WEB UI)

The TrueView 625 payload uses a web user interface (Web UI) to connect the payload through any standard web browser. With the Web UI the user can monitor the system operation, readiness for data collection, and change settings. Web UI helps with troubleshooting by providing additional information about errors and issues. For more information on the Web UI function go to TrueView Web UI User Guide.

FIRMWARE UPDATE

TrueView 625 users will install the firmware update.

Please make sure the following conditions are met before updating the payload firmware.

- ✓ The payload is mounted and properly connected to the drone.
- ✓ The drone battery is fully charged.
- ✓ The drone with the payload is outside with visibility to the sky where the GPS fix can be found.
- ✓ The mdCA is running with a DDL connected to verify payload initialization.
- ✓ Make sure the UMS storage device is available.

Firmware installation:

1. Make sure the above prerequisites are met.
2. If not already done, download the latest version of the firmware.
3. Make sure the drone and payload are powered OFF and that the battery is disconnected.
4. Install the TrueView 625 UMS storage device into the computer.
5. Copy all the files with the **.mdpkg** and **.json** extension on the UMS storage device.
6. Power ON the TrueView 625 payload as you would do for a normal flight.
7. The firmware will install automatically. Allow up to 2 minutes for the process to complete. The two lights on the front of the payload will blink blue for 10 seconds when installation is successful. The payload will reinitialize automatically upon completion.
8. If no flight is required, follow the instructions in the **Multifunction button** section to shut off the payload. Once completed power off the drone by disconnecting the drone battery.

Verification of the update:

1. Remove the UMS storage device from the TrueView 625 payload and insert it into the computer.
2. Navigate to the UMS storage device drive and verify the file extensions was changed to .**installed** on every **.mdpkg** and **.json** file. This means the installation of the firmware was successful. **Remove the install files once installation has been successful.**
3. GeoCue recommends completing a flight after the firmware update to quality check the data beforethe next operation.

Please contact GeoCue at support@geocue.com if you have any questions and /or require assistance.

Base Station

The TrueView 3DIS records GNSS signals during flight which will be corrected later in EVO. This type of system is known as a PPK system. Base station processing methods should be considered during the planning process because the user will need to determine how they plan to correct their flight data before collecting. TrueView GNSS signals can be corrected by one of three methods:

1. **Single base** – Single base, as the name implies, is a static recording from one single base station which is close in proximity to the flight area. Corrections are computed at the base station, then applied to the data collected by TrueView. CORS stations can also be used for single base processing if they are within 12 miles of the flight area and record static data at 1Hz. The base station must also record both L1 and L2 signals and must be during the same time as the flight. Single base is the only processing method if you plan to process with the local option selected.
2. **SmartBase** – SmartBase is a cloud processing option that uses multiple CORS stations to compute base corrections for your flight. Smart base processing allows for longer baselines from the flight area and the user does not have to set up a base station or download CORS data from a nearby station. This option still requires an existing CORS network in the area of flight. Users can go online to the Applanix SmartBase website and determine if their flight location is covered by the SmartBase network and estimate the quality of the results.
3. **PP-RTX –** PP-RTX is a cloud processing option that does not require a base station or CORS network. PP-RTX corrections can be computed anywhere. Accuracy is reduced using this method but can be used as a last resort option in the event of base station failure or lack of CORS network.

More information can be found in our knowledge base articles:
https://support.geocue.com/positioning-options-in-true-view-workflows/
https://support.geocue.com/single-base-vs-smartbase-vs-pp-rtx

Pre-Flight

Disable Obstacle Avoidance

IMPORTANT M300 Only

The integration of the TrueView 3DIS system will cause disruption to the M300's built-in obstacle avoidance detection systems. If these systems are not disabled, they can cause erratic and potentially dangerous behavior including loss of control of the drone. To disable obstacle avoidance, perform the following steps:

1. Launch the DJI Pilot application, open a mission, or go into manual view.
2. Tap the Ellipsis menu (...) on the top right corner of the screen.
3. Tap the second icon from the top Obstacle Sensing Settings
4. Tap each tab for Horizontal, Upward, and Download tap the toggle button off for each category. (**Figure 19**)

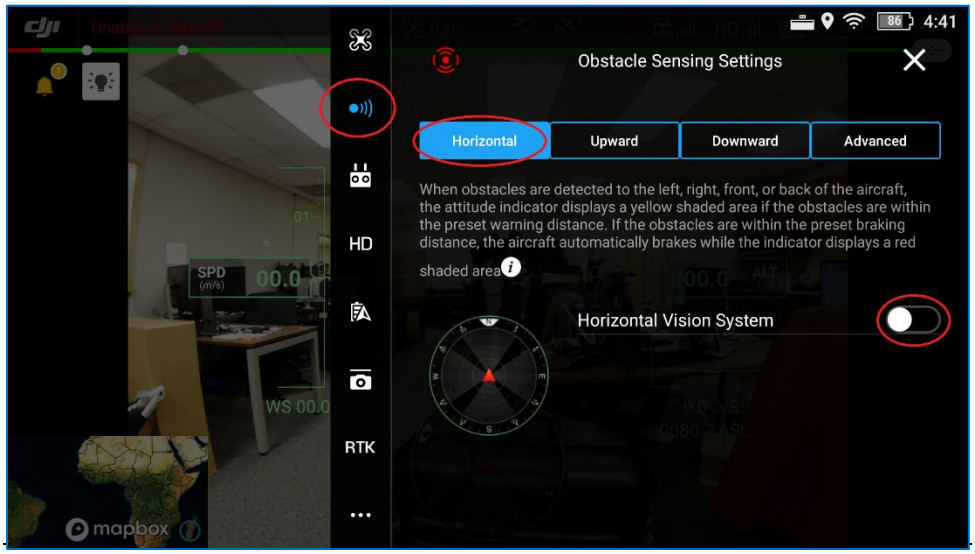

Figure 19. DJI Pilot - Obstacle sensing settings menu.

Center of Gravity (GC) Calibration

IMPORTANT M300 Only

When heavy payloads are carried on the M300 platform a center of gravity (GC) calibration must be performed if there is any change to the payload. This would include if you switched from a TrueView 410 to a TrueView 515 or DJI P1 or even switched to flying without a payload. The aircraft must be in flight and hovering to start the calibration. It is ideal to perform this calibration in a wind free environment. To perform the GC calibration, perform the following steps:

1. Launch the DJI Pilot application, open a mission, or go into the manual view.
2. Tap the Ellipsis menu (…) on the top right corner of the screen.
3. Stay within the Flight Controller Settings tab and scroll to the bottom of this screen.
4. Tap the Center of Gravity Auto Calibration Button and follow the instructions. (**Figure 20**)

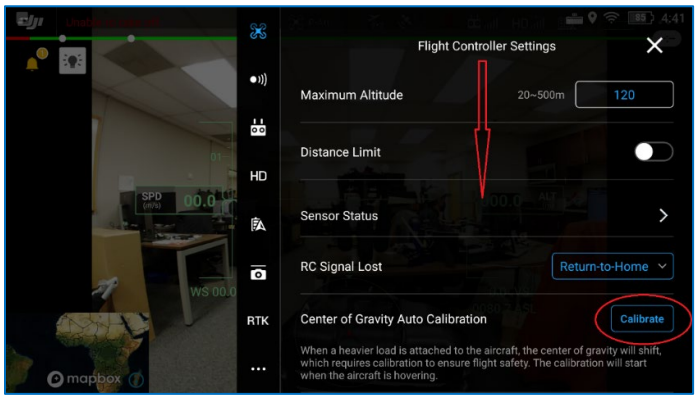

Figure 20 DJI Pilot - Flight controller settings menu.

LED lights operation

When the power switch is turned on (if the drone is equipped with one) or power is applied to the system, the system will go through the startup procedure as normal, and all LED lights will flash yellow. After a few seconds, each LED light will begin to show a sequence. Please see section **LED status lights** for more information.

Heading Alignment Maneuver

The heading alignment maneuver needs to be done after takeoff, before flying the mission, and after the mission prior to landing for each flight. This maneuver is critical for getting accurate heading corrections for the IMU and will impact the results of the data if not performed.

1. Before takeoff, identify a safe direction to perform the heading alignment maneuver. Avoid areas with people, bodies of water, and obstacles.
2. After takeoff, once at mission altitude, let the drone hover in place for two seconds.
3. Push the right stick all the way forward quickly and hold until the drone accelerates to 10m/s. This should take about four seconds. Do not provide any other input. The drone should be accelerating in a straight line.
4. After reaching 10m/s, about four seconds of forward flight, release the stick and leave it centered. The drone will quickly stop. **Note: Speeds beyond 12-14 m/s may yield poorer results.**
5. Wait two seconds, then use the left stick to turn (yaw) the aircraft about 15-20 degrees, then wait a second. (This is for safety; it is intended to prevent the drone from returning directly overhead when you do step 5. Yaw the drone in a direction so that its return path will be clear of people below, and when it returns, it will be at least 15-20m away, and in front of you.)
6. Pull the right stick all the way back quickly and hold until the drone accelerates to 10m/s. This should take about four seconds. Do not provide any other input. The drone should be accelerating in a straight line backwards.
7. After reaching 10m/s, about four seconds of backward flight release the stick and leave it centered. The drone will quickly stop. Wait at least two seconds after it stops before starting the mission. **Note: Speeds beyond 12-14 m/s may yield poorer results.**
8. Fly the mission you have planned.
9. At the end of the mission allow the drone to return to home, but do not let it descend, a final heading alignment maneuver needs to be done.
10. To take back manual control over the drone.
11. Repeat steps 1-6 again. Make sure that when repeating step 4) that you turn the drone sufficiently that it will be several meters (>5) away from the takeoff location at the end of its backwards travel. This is needed so that when returning automatically, the drone will properly navigate to above the takeoff location before beginning its automatic descent. If you are closer than 5m, it will likely begin descending without aligning with the original takeoff location.
12. After the drone has been stationary for two seconds, hold the (Home) button to begin the automatic return and landing. Watch the drone carefully to be certain it is landing in the intended spot. Otherwise, make the necessary adjustments or take manual control to complete a safe landing.

NOTE: On windy days, avoid starting the maneuver into a headwind, as the drone may not be able to achieve high enough accelerations. Try doing the maneuver crosswind if possible.

Figure 21. Heading alignment maneuver.

After Landing

1. After landing the SYS LED should be flashing white, indicating the system is transferring data. Do not power off the system during this time or it will interrupt the data transfer.
    a. If proximity mode is disabled or the aircraft does not land within 25 meters of the home point, the SYS LED will be blinking green after landing. Short press the multi-function button on the TrueView, the SYS LED changes from blinking green to flashing white.
2. The flashing white light indicates the TrueView is writing data to the drive. Be sure not to power off the TrueView or remove the drive during this period.
3. When the system LED changes to solid white, the flight data has been transferred to the UMS drive.
4. Power off the TrueView system.
5. For missions requiring multiple flights, repeat these steps from the "pre-flight" section of this document. The system should be completely powered off between flights (battery swaps) after the data has been successfully written.
6. Check the data for errors before leaving the field.
7. Field check the data to verify all data has been collected. The Field check instructions can be found in the LP360 Users Guide.

TRUEVIEW MISSION CHECKLIST

Step	Action	Notes
1.	Setup base station and turn ON.	
2.	Check mission plan; modify if necessary.	
3.	Complete a safety briefing and flight plan review with field crew.	
4.	Install TrueView on drone mount.	
5.	Verify payload adapter latch is in the locked position and secured. Add safety wire for extra security.	
6.	Verify safety cable attached between TrueView and drone rails.	
7.	Check all drone GPS antennas upright and secured.	
8.	Verify the TrueView UMS memory stick is inserted and sufficient storage is available.	
9.	Move drone to takeoff location.	
10.	Unfold and secure drone arms, lock in place.	
11.	Unfold drone propellers, visually inspecting for any problems.	
12.	Install fully charged drone batteries. Do not turn the unit ON.	
13.	Double-check all cabling is secure and will not interfere with the props.	
14.	Remove TrueView lens caps; clean lenses/sensor if necessary.	
15.	Power on TrueView .	
16.	Turn on drone controller then power on the drone as per normal operations.	
17.	Monitor the TrueView status lights waiting for: 1. SYS – Solid Green - TrueView has been initialized, ready for takeoff. 2. GNSS – Flashing Blue - Valid date/time stamp received.	
18.	Wait for drone to initialize and verify there are no errors showing.	
19.	Power on the TrueView.	
20.	Safety Check: Area clear of individuals and flight space is clear to fly.	
21.	Manually take-off and ascend to mission altitude. Verify good LOS to drone and planned flight area.	
22.	Manually perform IMU in-air heading alignment maneuver.	
23.	Initiate mission via flight planning tool.	
24.	Monitor drone/ TrueView during flight as per normal operations.	
25.	Upon completion of the last flight line in the mission plan, allow the drone to start the Return to Home sequence, but do not let it descend at the Home point. Toggle drone to manual control (P->A->P) instead.	
26.	Manually perform IMU in-air heading alignment maneuver again.	
27.	Ensure the landing area is still clear; complete the landing via Return to Home or manually as preferred.	
28.	Verify SYS light is flashing white (transferring data).	
29.	Monitor the TrueView SYS LED; flashing white means data is being copied to UMS; solid white data copy is complete. Wait for solid white to go to the next step.	
30.	Power TrueView OFF using main power switch in battery compartment (door must be open to toggle). Never power OFF while SYS LED is still blinking white indicating a copy operation is in progress; data loss will occur. If SYS LED turns to blinking or solid red, it is safe to turn off and move to troubleshoot section or contact GeoCue for further instructions.	
31.	Remove UMS memory stick and pass to post-processing.	

SUPPORT

Our searchable support knowledge base contains information on workflows, tips, hints, and probable resolutions to error messages or commonly encountered situations.

Normal support business hours are **Monday - Friday, 8 AM — 5 PM** USA Central Time.

Our contains general workflow information, in addition to specific issue and error messages that you may encounter. Click on the link and search for information contained in the knowledge base.

If a support request is sent during business hours a representative will typically get back to you within 4 hours. If received after hours, a response will be sent the following day. To speed response time please include the following information in your request:

- Contact information - please include e-mail address and phone number
- Company name
- Product name and version number
- Model and Serial Number

If your request includes problems pertaining to a specific error message, please include a screenshot of the error message.

For hardware and software support contact: support@geocue.com

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LIST OF FIGURES