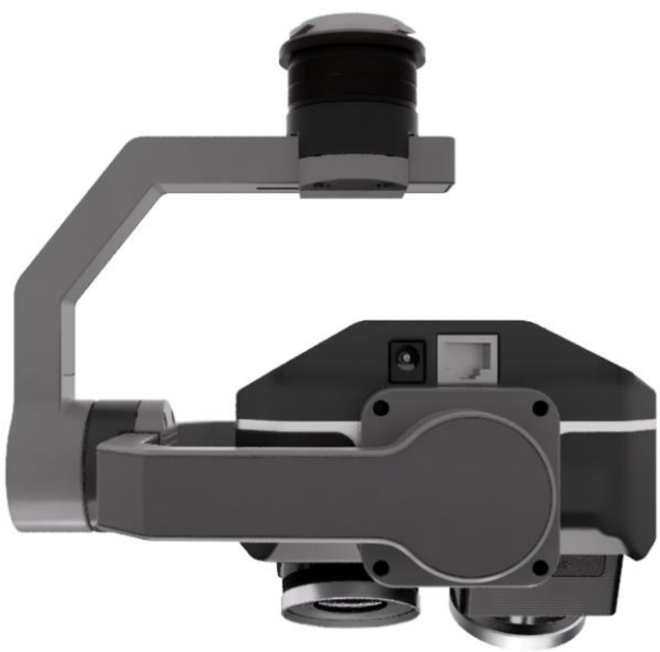
True View 250 Hardware User Guide

GeoCue Group, Inc
2/26/2021
Version 1.4.4



Updated for Firmware Version 3.0.5

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About GeoCue Group, Inc.

GeoCue Group 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 Group 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 new True View LIDAR/Imagery fusion sensors. To learn more, visit www.geocue.com.

About True View® 250

The True View® 250 features dual GeoCue mapping camera with a 120° fused field of view for efficient and accurate photogrammetric data collection in a 1 kg package. The system is currently compatible with the DJI M200 v2 and will soon be ready for use with the DJI M300RTK other aircraft may be integrated in the future, custom integrations can be performed by GeoCue by contacting our sales department.

A True View Cycle

All True View sensors write their various data streams to a standard file folder structure called a "Cycle." 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 a flight.

True View 2DIS Hardware Integration Kit (DJI M200 v2)

The True View 250 was designed to be used with the GeoCue True View Integration kit, which includes the Controller Box plate which hold the antenna mast base and the antenna mast. If you purchase a compatible sUAS from GeoCue the integration kit will be installed by a technician. If you purchase a compatible sUAS from a third party, you will need to install these components before using your True View system. The following steps explain how to install your True View integration kit.

Installing the Controller Box Plate

1. To install the controller box plate and the controller box you will need the following components:
    a. Controller Plate (Figure 1)

Figure 1 - Controller Box Plate with Antenna Mast Base

    b. Controller Box (Figure 2)

Figure 2 - Controller Box

c. Bottom mounting brackets (2) (Figure 3)

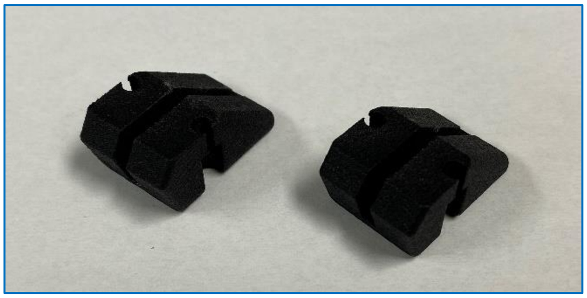

Figure 3 - Bottom Mounting Brackets

d. Screws (4) (Figure 4)

Figure 4 - Screws

e. 1.5mm ball end hex driver (Figure 5)

Figure 5 - 1.5mm Ball End Hex Driver

f. Loctite
g. Masking tape or non-adhesive tape

2. Place the controller box plate on top of the Skyport Assembly. Slots of the bottom will match the width of metal arms and seat on top. Secure its position with masking tape to help hold the plate while setting the screws. (Figure 6)

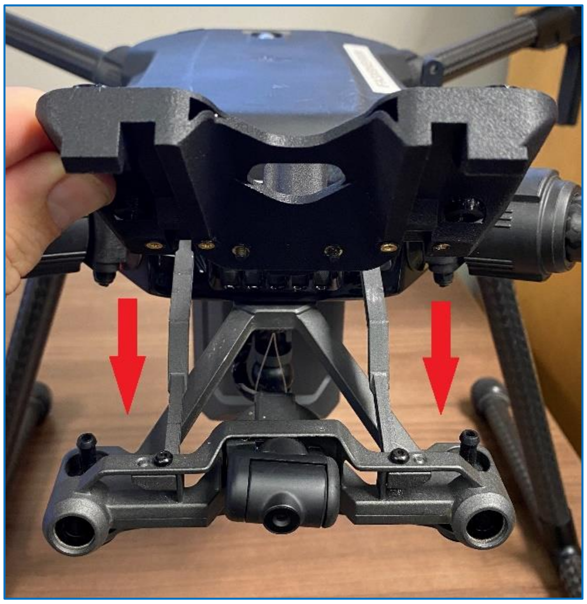

Figure 6 - Place Control Box Plate on Skyport Assembly

3. Flip the aircraft over and apply more masking tape if necessary, to secure the controller plate.(Figure 7)

Figure 7 - Masking Tape Securing the Controller Box Plate

4. Place the bottom mounting brackets over the screw hold on the controller box mounting place. The center slot and angle will align with the metal arm of Skyport assembly which will let you know it is placed correctly. (Figure 8)

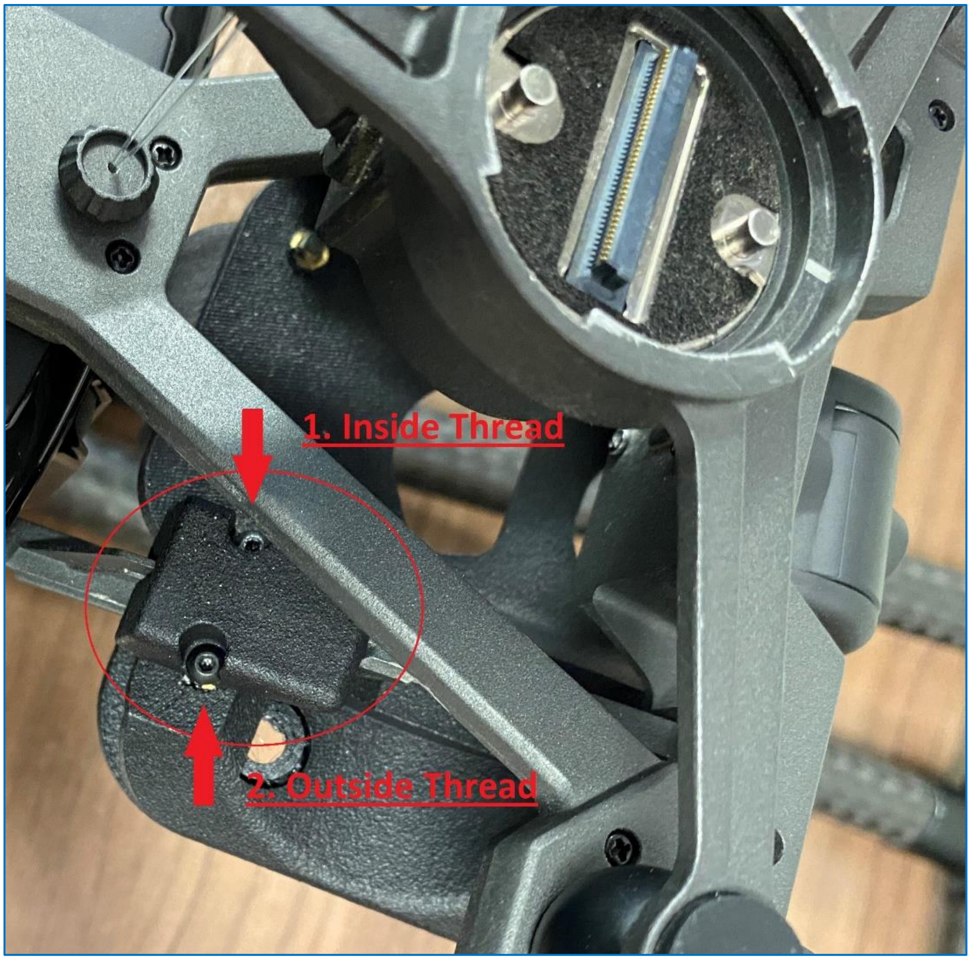

Figure 8 - Bottom Mounting Bracket – View from Below Aircraft

5. Apply Loctite to a screw and begin by threading the screw socket facing the inside. Be aware the metal bar will partially obscure the access, this is the reason for the ball end hex driver, so you can turn the screw at a slight angle. Do not completely torque down the screw yet, leave some play to help align the outside facing screw. Repeat this on the other side.
6. Apply Loctite to another screw and thread it through the outside facing screw socket threading for both bottom mounting brackets. Once both screws are threaded on both sides continue to screw them down while alternately each side, so the bracket secures evenly. Once all screws are secured down you can apply a very light torque to fully tighten them.
7. Once the controller box plate is secured you can flip the aircraft up and remove the masking tape. You can now secure the controller box on the controller box plate by pressing the feet through the grommets. (Figure 9)

Figure 9 - Controller Box with Plate, Side View

True View 2DIS Installation (DJI M200 v2)

Between operations with the True View 250 you may need to install and remove its components although the controller box plate should be able to stay on a fit in a case. This section will detail all the components for the True View 250 installation on a DJI M200 v2 the removal will be the reverse process.

1. The following components are required for True View 250 operations.
   a. Dual camera system mounted to gimbal.(Figure 10)

Figure 10 - Dual Camera System with Gimbal

b. Controller Box (Figure 11)

Figure 11 - True View 250 Controller Box

c. Antenna Mast with coaxial GNSS cable (Figure 12)

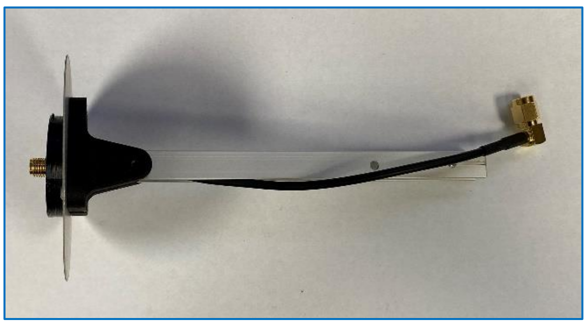

Figure 12 - Antenna Mast with Coaxial Cable

d. GNSS antenna (Figure 13)

Figure 13 - GNSS Antenna

e. Cat6 cable with right angle sockets (Figure 14)

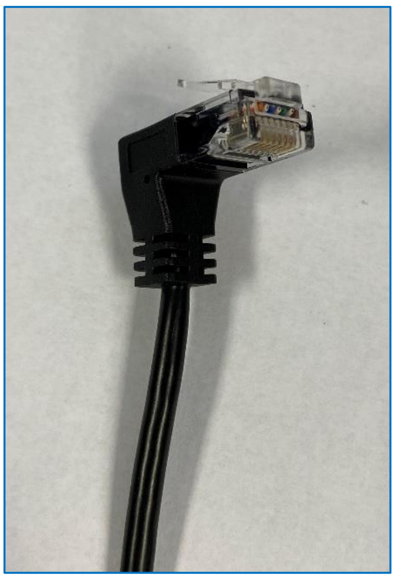

Figure 14 - Cat6 Cable with Right Angle Plugs

f. Power cable with doubled ended barrel connectors (Figure 15)

Figure 15 - Power Cable with Doubled Ended Barrel Connectors

g. Small zip ties
h. Velcro band or strap

2. The controller box has feet that can be attached and removed to matching grommets on the controller box plate. (Figure 16)

Figure 16 - Controller Box attached to Controller Box Plate

3. Screw the GNSS antenna screws on top of the antenna mast. Seat the antenna mast on the antenna mast base on the controller box plate. Secure the GNSS coaxial cable to the controller box coaxial port. (Figure 17)

Figure 17 - GNSS Antenna and Mast

4. Connect the Skyport socket. Align the white dot on the dual camera gimbal with the red dot on the aircrafts Skyport, press upward and turn right until the red dots on both ends align. To remove press button on the left side of the Skyport turn left and pull downward. (Figure 18)

Figure 18 - Attached Gimbal to Skyport

5. Connect the Cat6 and barrel power connector to the dual camera system and the controller box. Bind the two cables together every few inches with zip ties and clip the excess material. Bind the cable pair with a Velcro tie to one of the arms of the Skyport mount. Allow enough slack for the gimbal to turn 360° in each direction. When the aircraft is powered on the gimbal will spin 360° both ways to calibrate its range. If this movement is impeded in any way the gimbal may appear limp or hanging. In the situation power down the aircraft, adjust your cable management so as not to impede the movement of the gimbal and power on the aircraft again to test your configuration. (Figure 19)

Figure 19 - Cable management and UMS

6. Ensure the UMS is inserted into the USB port of the dual camera system. (Figure 19)

True View 2DIS Power Supply

The True View 250 system is powered by the skyport interface which is powered by the aircraft batteries. The only operation the pilot needs to perform is ensuring that the barrel connector to the control box is connected, remains secure, and is not a safety hazard to the propellers or landing gears normal operations. To power-on the True View 250 turn on the aircraft using the short-press long-press pattern. To power down the True View ensure that your cycle is complete and repeat the same pattern. If the aircraft were to lose power the True View system will lose power as well.

True View USB Mass Storage (UMS)

The True View 250 system includes a USB storage device we refer to as the UMS or Universal Mass Storage. The UMS contain configuration files that hold operating parameters and well as user configurable options. The UMS also store the cycle data for each flight which includes the image files, GNSS rover observation, and various other log file used for data processing and troubleshooting. The UMS need to always be present in the True View system for both its operation and data storage. If you need a replacement or backup the file system must be formatted as NTFS and contain the SystemConfiguration.json as well as the CoreConfiguration.json file that came supplies on your original UMS with your sensor. If you lost access to these files you can contact GeoCue support and we can get your new copies.

System Configuration File (SCF)

The System Configuration file (SCF), SystemConfiguration.json, must reside on the True View 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 True View system and is used by True View EVO to process True View data. The latest calibration file for each sensor is stored on the True View Reckon portal.

Core Configuration File (CCF)

True View System settings are stored internally to the system, but can be changed by modifying the CoreConfiguration.json file on the UMS. The system identifies if the file has been modified, then operates accordingly. Features may be turned on or off by using a true or false Boolean in the Core Configuration file. Other fields can be configured with a numeric value, such as the Battery Status Percentage or Proximity Mode Distance.

Note: It is recommended to open and modify the Core Configuration file with Notepad++.

The following sections describe the most common sections of the Core Configuration file that a user may wish to modify.

True View 250 Field Operations

Base Station

The True View 250 records GNSS signals during flight which will be differentially corrected in True View EVO software. This is a type of differential correction known as PPK (Post-Processed Kinematic). To utilize PPK corrections a static observation from a nearby base station is required. There are various options available for obtaining a base station static observation data.

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 collect collected by the True View. This local base station can be operated by the pilot or obtained from another party operating a base station if they use the correct collection parameters. CORS (Continuously Operating Reference Stations) can also be used for single base processing if they are within 12 miles of the flight area. Any static base observation must be collected at least a 1hz rate record both L1 and L2 signals. The base station must be in operation of the entire duration of 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 setup 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

1. Ready the drone for flight in accordance with the manufacture's instruction. Install the True View 250 components as detailed in the installation section of this manual.
2. Ensure your base station is recording static data if this is the method you intend to process the data with.
3. Place the aircraft in an open area where you intend to takeoff. The True View will need an unobstructed view of the sky. Avoid placing the drone near large metal objects, trees, or tall buildings to minimize multi-pathing error.
4. Power-on the aircraft.

5. After the aircraft is powered on the True View will go through its startup procedure and all lights on the controller box will flash yellow. After a few seconds, each LED light begin to show a sequence of colors indicating status.

    a. BAT: Flashes until the battery percentage is known, then turns a solid color.
        i. Green LED indicates battery is above 50%.
        ii. Yellow LED indicates battery is between 30 and 50%.
        iii. Red LED indicates battery is below 30%.
    b. GNSS: This LED will flash yellow until GNSS signal is received, then turn solid green.
    c. SYS: The system light will flash yellow until the system is ready for operation. When the system is ready, it will begin flashing green if proximity mode is active.
        i. Proximity mode is a feature added in firmware version 2.0.3. When the system is powered on, its position is recorded, and this position is used as the home point for the system. Once the sensor travels a specified distance (25 meters by default) from the home point, the system automatically begins recording data. This feature can be disable by setting the "ProximityMode" flag to false in the Core Configuration file on the UMS. If the feature is disabled, you will have to manually start recording data by pressing and holding the green button until the SYS light turns solid green.

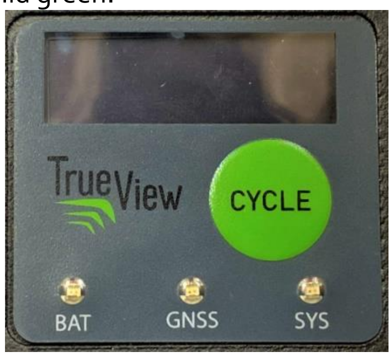

Figure 20

9. When the SYS LED is flashing green, this means the proximity mode is active and you are ready for takeoff.
    a. If proximity mode was disabled by the user, wait for a solid yellow SYS light then press and hold the green button until the SYS light turns solid green.
10. Turn the drone and transmitter on and connect to the drone on the iPad.
11. Arm the drone and take off and climb to the mission altitude.
12. Once the system travels 25 meters from takeoff (X,Y, and Z), it will begin recording data.

Figure 60 shows all the lighting sequences, LED messages, and their meanings. Figure 61 shows how to interpret the symbols in the table.

BAT	GNSS	SYS	LED Readout	Meaning
✹ (yellow)	✹ (yellow)	✹ (yellow)	GeoCue Group True View	True View Initializing …
		✹ (white)	Firmware Updating	Updating Firmware
		✹ (white)	Firmware Updated	Firmware Updated Successfully
✹ (yellow)			Battery Check	True View checking battery
✹ (yellow)		✹ (red)	Insert UMS, Press Cycle	Cannot recognize UMS. Plug-in or re-seat UMS and press Cycle
● (yellow)			Battery %	Battery level
● (yellow)			UMS Mounted	UMS is mounted and recognized by True View
● (green)		✹ (yellow)	Copying Old File	Recovering cycle from improper shutdown
● (green)	✹ (yellow)		Init. GNSS	Checking GNSS Signal
● (green)	✹ (yellow)		GNSS Ready	GNSS has initialized, ready to set location
● (green)	✹ (yellow)		System Starting Getting Location	Setting location
● (green)	● (green)		Location Set	Location is set
● (green)	● (green)	✹ (yellow)	Init. Camera	Checking cameras
● (green)	● (green)	✹ (yellow)	Cameras Ready	Cameras are ready
● (green)	● (green)	✹ (yellow)	Init. Lidar	Connecting to Lidar
● (green)	● (green)	✹ (yellow)	Lidar Connected	Lidar is connected
● (green)	● (green)	✹ (yellow)	Lidar Ready	Lidar has started
● (green)	✹ (yellow)	✹ (yellow)	Proximity Mode	Proximity mode ready, satellites below 4
● (green)	✹ (red)	✹ (yellow)	Proximity Mode	Proximity mode ready, GNSS signal lost
● (green)	● (green)	✹ (yellow)	Collecting Data	Collecting data
● (green)	● (green)	✹ (yellow)	Wind Down	Cycle wind down, do not power off
● (green)	● (green)	✹ (yellow)	Copying Images	Copying images, do not power off
● (green)	● (green)	● (yellow)	Flight Complete	Wind down complete, ready to turn off
● (green)	● (green)	✹ (green)	Proximity Mode	Proximity mode active, ready for takeoff
● (green)	● (green)	● (green)	Recording Data	Data recording in progress, to override proximity mode press cycle
	● (red)		Wind-down	GNSS completely lost during cycle

	✹ (red)		Wind-down	GNSS dropped below 4 satellites during cycle
● (green)	● (green)	● (red)	Hard Fault	Unrecoverable error power cycle system
● (green)	● (green)	✹ (red)	Hard Fault	Ensure camera SD cards are inserted and properly formatted
● (green)	● (green)	✹ (red)	UMS Missing	Plug-in or reseat UMS and press Cycle

Figure 21 - Controller Box LEDs

True View EVO

True View Evo is a 64-bit Windows® desktop application used for processing and exploiting True View sensor data. It is GeoCue's LP360 point cloud exploitation product with the addition of a collection of tools for True View sensor data workflows. Currently, True View Evo is available in two licensing levels:

- True View Evo – This is equivalent to LP360 Advanced with the addition of the True View workflow tools. It is limited to product areas of no more than 4 km^2 of LIDAR data
- True View Evo Unlimited – this is the same functionally as True View EVO but the size limit is removed.

True View EVO is the software used to post-process your raw flight data. EVO will generate a 3D LIDAR point cloud in LAS format, colorize the point cloud, geotag the images collected, etc… It is based on GeoCue's LIDAR point cloud exploitation software, LP360, and comes with all the same tools as LP360 Advanced. Tools such as accuracy assessment, automatic and manual ground classification, and contour/ surface exporting.

See the True View EVO User Guide for more information.

Support

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

https://support.geocue.com/

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

Our GeoCue Support website 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
- True View Model and Serial Number

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

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