



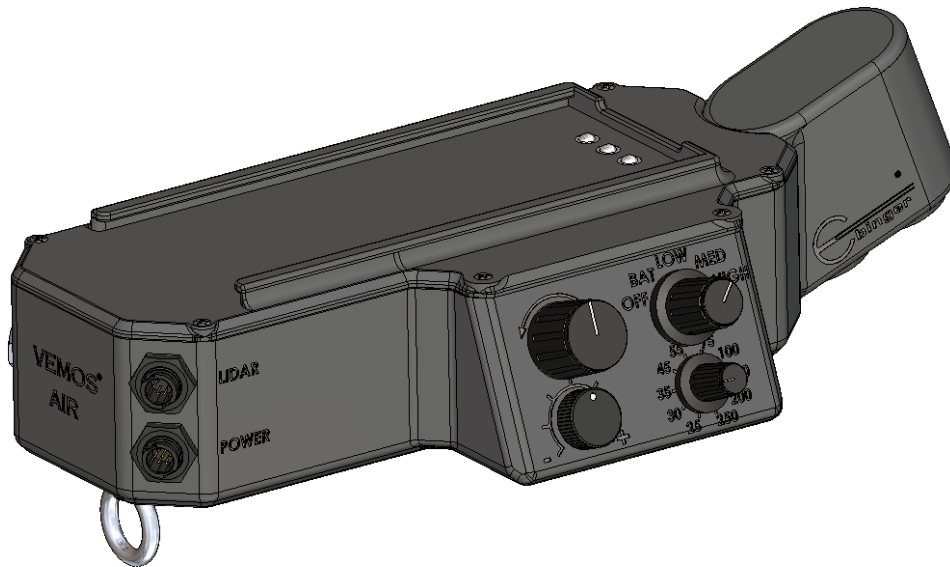
## Description

The VEMOS® AIR search system is used for deep probing and rapid inspection of large areas. The VEMOS® AIR detects ferrous and non-ferrous metals, as well as alloys. It is ideal for searching for underground depots, pipelines, storage facilities, manholes and sewer shafts, UXOs, and other large-scale metal objects.

### VEMOS® AIR System

- VEMOS® AIR
- Searchcoil 110
- SKYHUB
- UgCS
- EPAS AIR

|                                        |           |
|----------------------------------------|-----------|
| <b>1. VEMOS AIR Data sheet</b>         | <b>3</b>  |
| <b>2. Searchcoil 110</b>               | <b>7</b>  |
| <b>3. VEMOS AIR Assembly</b>           | <b>10</b> |
| <b>4. VEMOS AIR Installation</b>       | <b>17</b> |
| <b>5. VEMOS AIR Flight Preparation</b> | <b>50</b> |
| <b>6. VEMOS AIR Cabling</b>            | <b>70</b> |



## Description

The VEMOS® AIR search system is used for deep probing and rapid inspection of large terrain sections.

The VEMOS® AIR detects ferrous and non-ferrous metals as well as alloys.

## Configurations

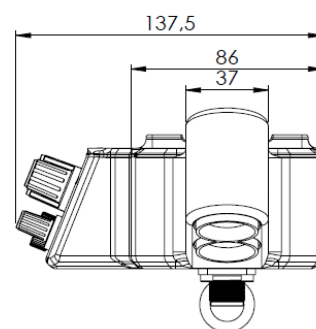
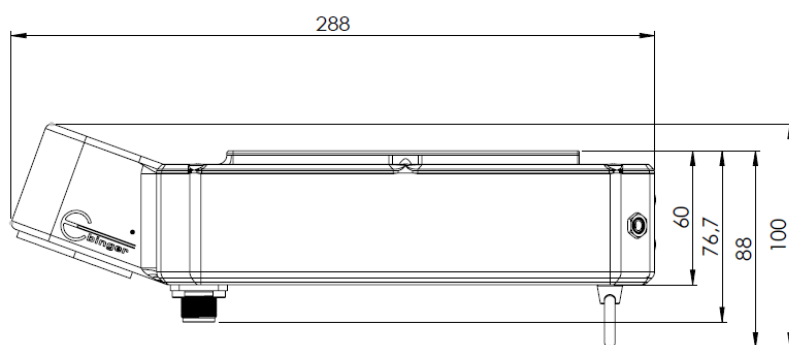
- Different search coils
- Various drones as carriers

## Advantages

- Different interfaces for data recording
- Complies with IMSMA requirements
- Variable carrier vehicles
- Pulse induction system
- Small object suppression

## Technical Data

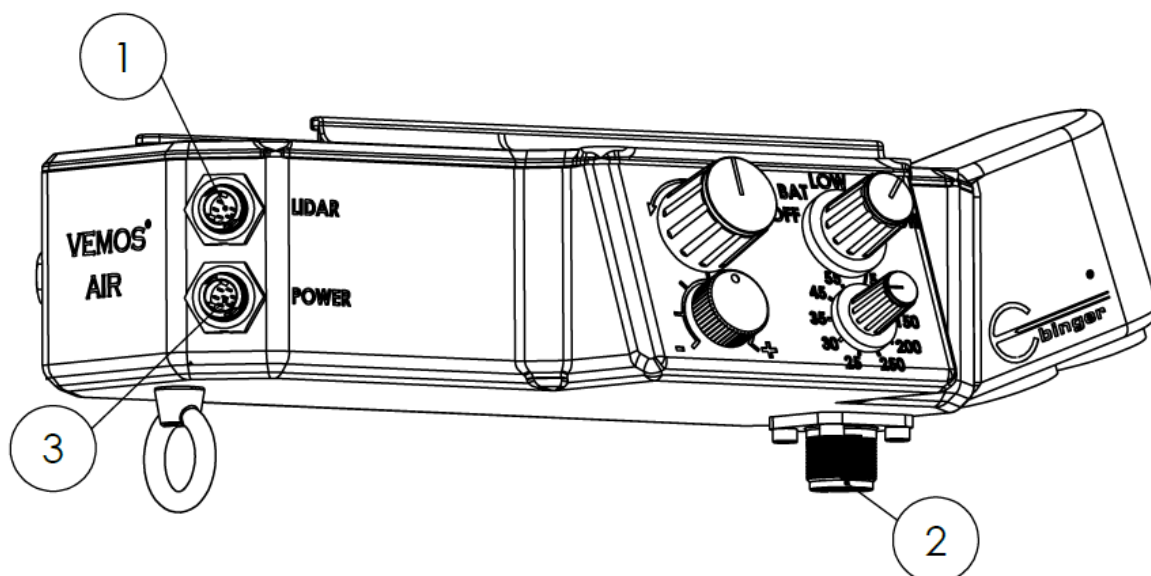
|                   |                               |
|-------------------|-------------------------------|
| Temperature range | -10°C to +55°C                |
| Power supply      | 12V                           |
| Signal display    | Wireless via computer or EPAD |
| Maße (L x W x H)  | 288mm x 137,5mm x 100mm       |
| Weight            | 690g                          |





## Interfaces

|             |                          |
|-------------|--------------------------|
| Connector 1 | LiDAR output             |
| Connector 2 | Search coil input        |
| Connector 3 | UART data output / POWER |
|             | Wireless data output     |

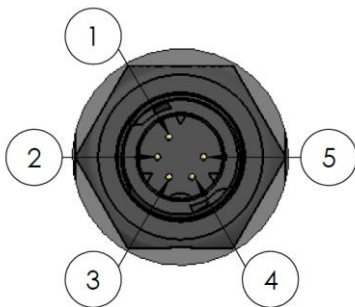


## Connector Pin Assignment

### LiDAR output

|       |     |
|-------|-----|
| PIN 1 | GND |
| PIN 2 | +5V |
| PIN 3 |     |
| PIN 4 | RX  |
| PIN 5 | TX  |

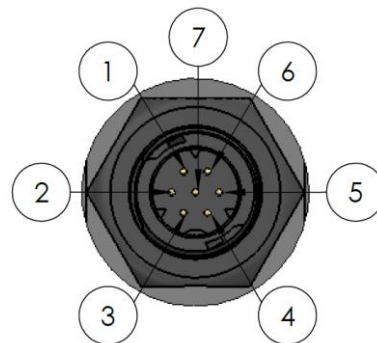
LiDAR



### Power + UART

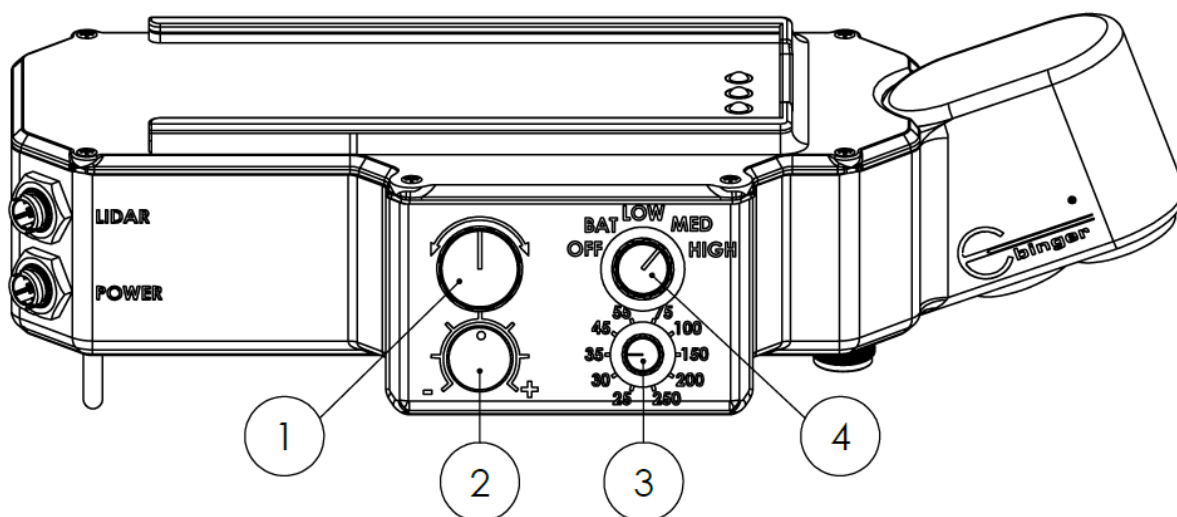
|       |               |
|-------|---------------|
| PIN 1 | 12V GND Input |
| PIN 2 |               |
| PIN 3 | +12V Input    |
| PIN 4 | RX            |
| PIN 5 | TX            |
| PIN 6 |               |
| PIN 7 |               |

POWER



## Adjustment Options

|   |                             |
|---|-----------------------------|
| 1 | Adjust (tone threshold)     |
| 2 | Frequenz (background noise) |
| 3 | Delay (measurement timing)  |
| 4 | Low, Medium, High (gain)    |





## Description

The Searchcoil 110 is used for deep probing and rapid inspection of large areas. Combined with the VEMOS® AIR, the Searchcoil 110 detects ferrous and non-ferrous metals, as well as alloys. It is ideal for locating underground depots, pipelines, storage facilities, manholes, sewer shafts, UXOs, and other large-scale metal objects.

## Configurations

- VEMOS® AIR
- UPEX® 740M

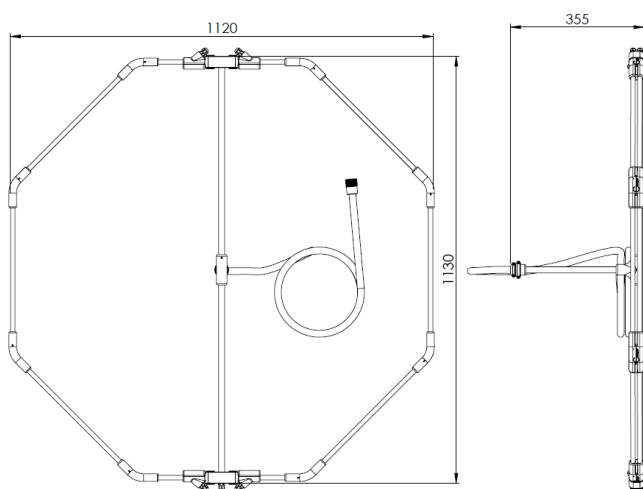
## Advantages

- Pulse-inductionssystem
- Small part suppression
- Folding function for easy transport

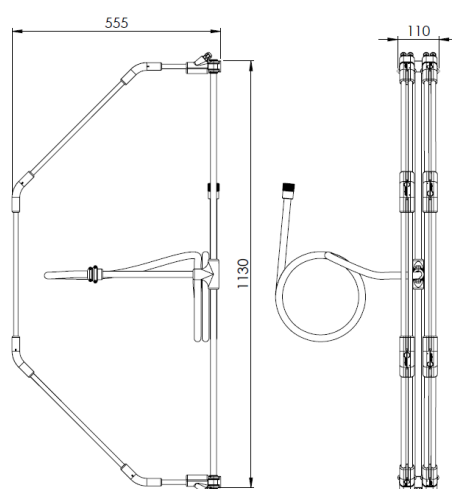
## Technical data

|                                 |                         |
|---------------------------------|-------------------------|
| Temperature range               | -10°C to +55°C          |
| Dimensions unfolded (L x W x H) | 1130mm x 1120mm x 355mm |
| Dimensions folded (L x W x H)   | 1130mm x 555mm x 110mm  |
| Weight                          |                         |

Ausgeklappt



Eingeklappt





## Assembly

### VEMOS® AIR / DJI MATRICE 350RTK

#### VEMOS® AIR System

- VEMOS® AIR
- Suchspule 110
- SKYHUB

## Mounting Plate

1.

Mount the adapter plate using the 4 supplied screws.



*(This step is required only during the first assembly, since the adapter plate can stay in place afterwards.)*

## SkyHub Montage

### 2.

Attach the SKYHUB to the right leg using the clamp fasteners.

*(Make sure that the clamp locks are properly engaged after installation.)*





## SkyHub Cabling

### 3.

- Secure the cable between MATRICE and SKYHUB
  - Insert the USB-C connector on the top side
  - Plug the yellow connector into the "PWR IN" port of the SKYHUB
  - Insert the 7PIN connector into the corresponding socket
- (Important: The connector color coding must be followed.)*



## Strain Relief Search Coil

4.

Insert the supply cable of the search coil into the 3PIN-MIL socket and tighten securely. Attach the cable to the hook of the electronics using the carabiner.



## **VEMOS® AIR Mounting**

**5.**

Slide VEMOS® AIR onto the adapter plate mounted in step 1.



## VEMOS® AIR Cabling

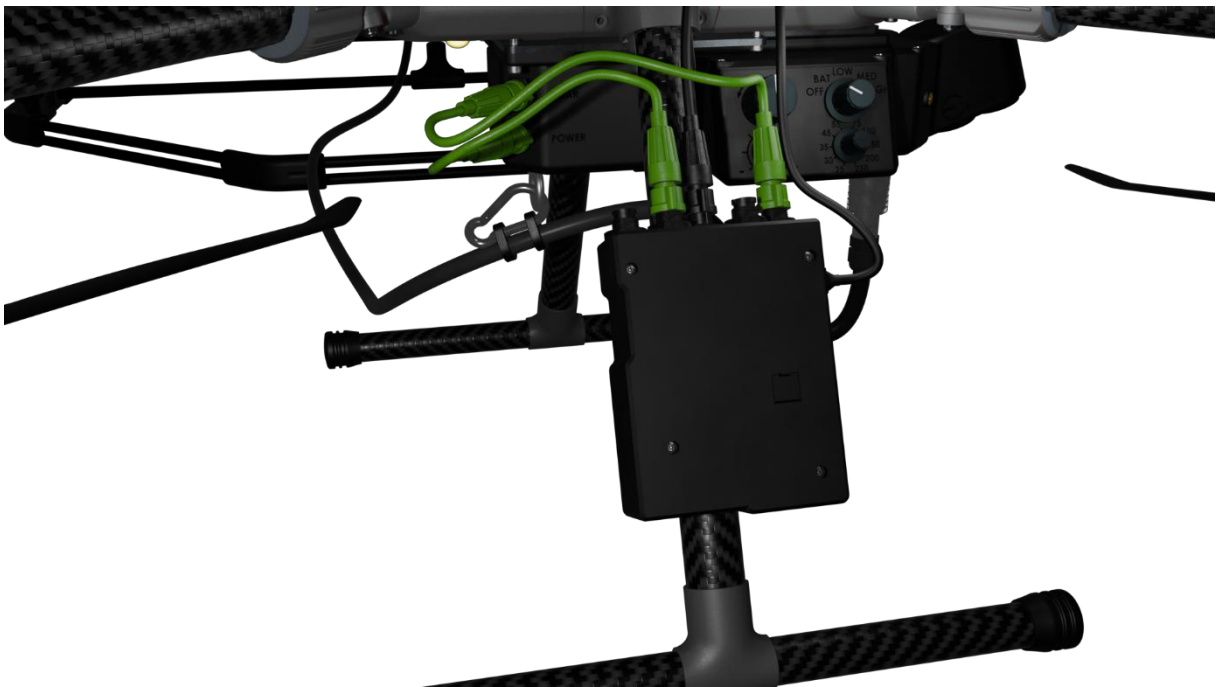
### 6.

Connect the cables for LiDAR and POWER between VEMOS® AIR and SKYHUB.

White: POWER

Yellow: LIDAR

*(Important: The connector color coding must be followed.)*





## Installation

### VEMOS® AIR / DJI MATRICE 350RTK

#### **VEMOS® AIR Installation**

- VEMOS® AIR System
- SKYHUB
- UgCS Payload Monitor
- UgCS PC
- UgCS Companion
- WinSCP

### SOFTWARE DOWNLOAD

#### PC/Laptop Downloads:

UgCS Payload Monitor

<https://www.sphengineering.com/integrated-systems/downloads>

UgCS (for mission planning)

<https://www.sphengineering.com/integrated-systems/downloads>

WinSCP

<https://winscp.net/eng/download.php>

#### Fernsteuerung Drohne:

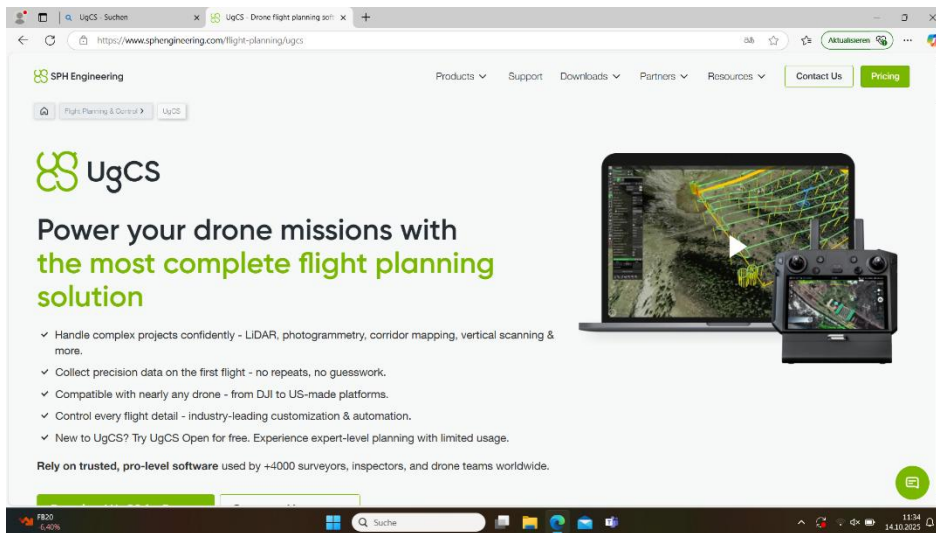
UgCS Companion (for DJI 350, M30, M3E)

<https://www.sphengineering.com/integrated-systems/downloads>

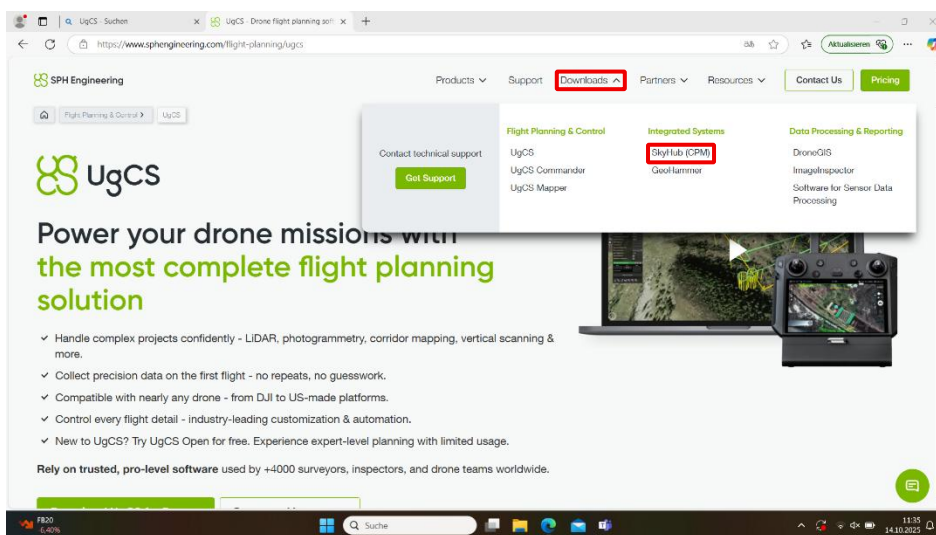
- 1. Installation and Activation UgCS Payload Monitor (19-26)**  
-.lic file
- 2. Installation and Activation UgCS (27-34)**  
-licence code
- 3. Installation UgCS Companion (35-42)**
- 4. Installation Win SCP (43-48)**

## Installation and Activation UgCS Payload Monitor

Visit the website [www.sphengineering.com](https://www.sphengineering.com)



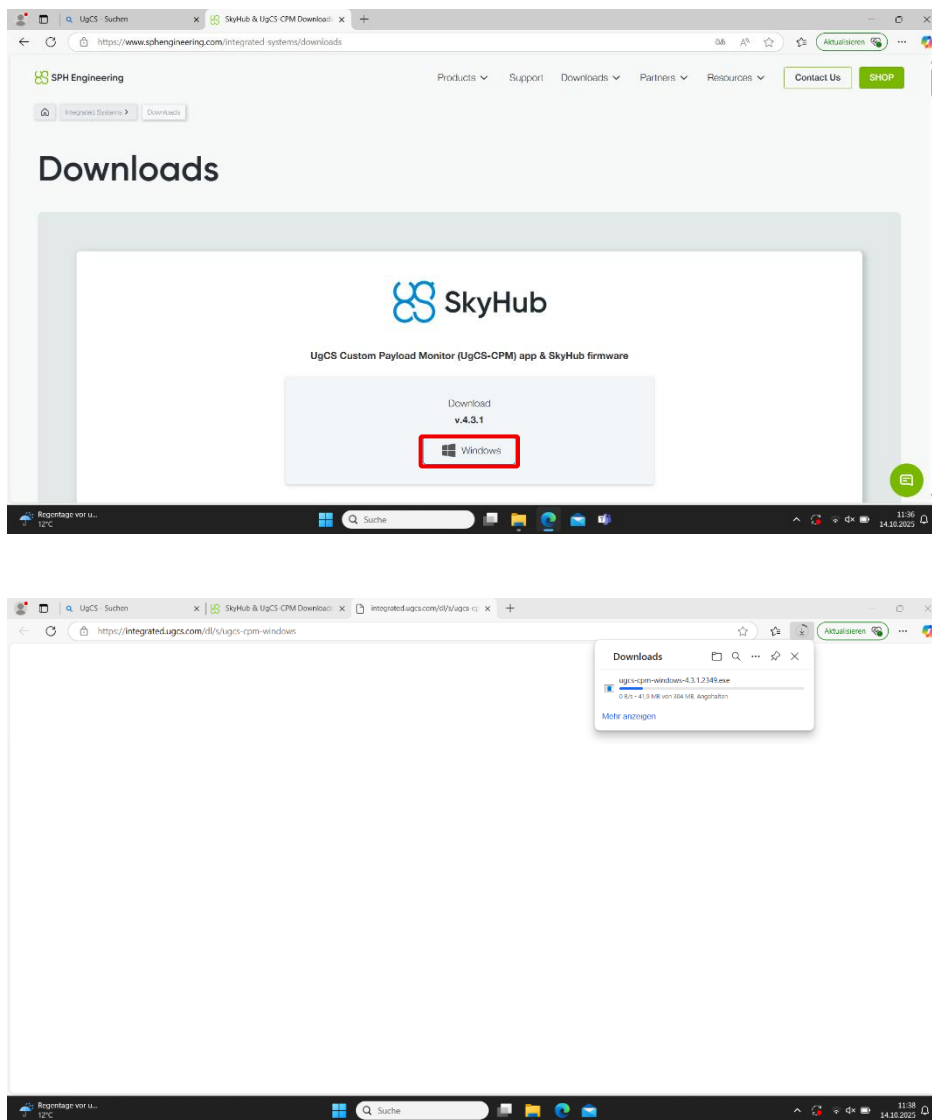
Navigate to “Downloads” and choose “SkyHub (CPM)”.





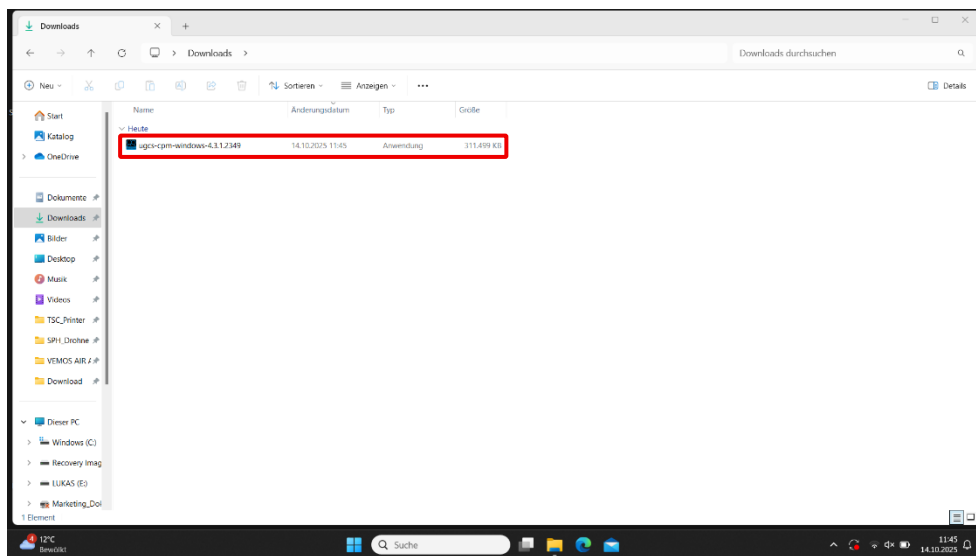
## Installation and Activation UgCS Payload Monitor

Click the Windows icon. This action will initiate the software download.

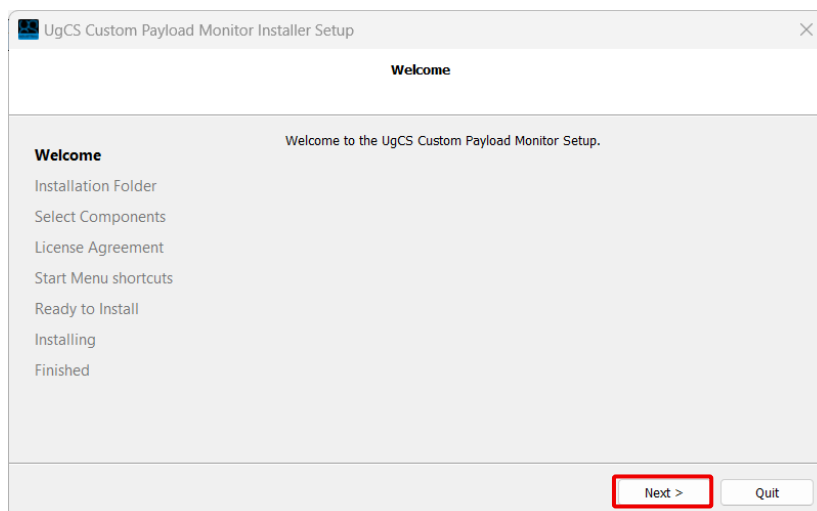


## Installation and Activation UgCS Payload Monitor

In the Downloads folder, you will find a file. Start it by double-clicking with the left mouse button.

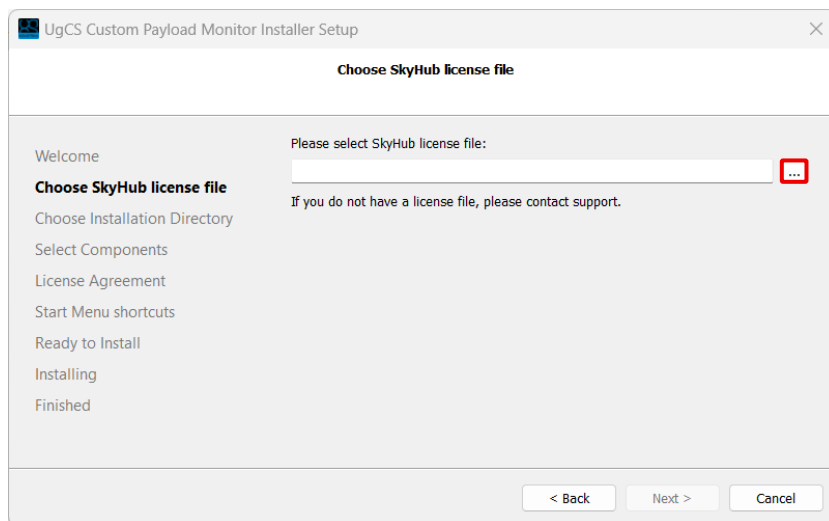


A window will open that guides you through the installation process of the UgCS Payload Monitor. Click Next to continue.

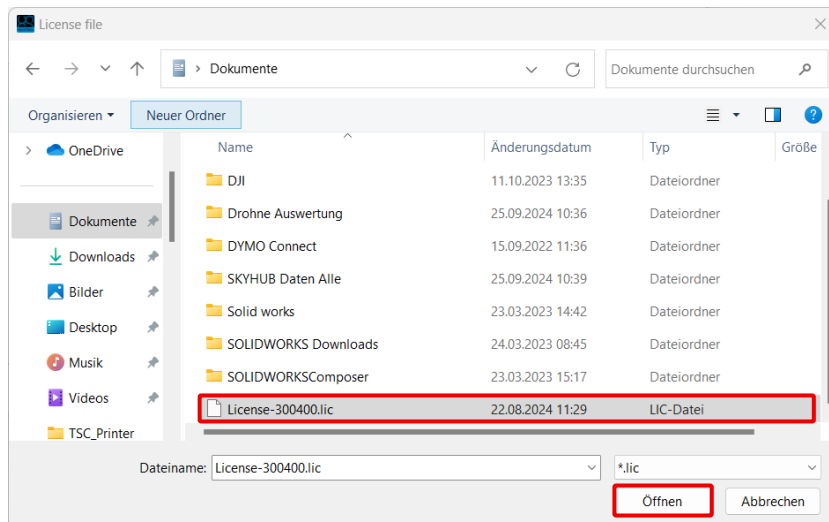


## Installation and Activation UgCS Payload Monitor

At this step, you will be asked to select the .lic file to confirm ownership of your SkyHub.  
Click the three dots next to the text box to browse and select the file from your documents.

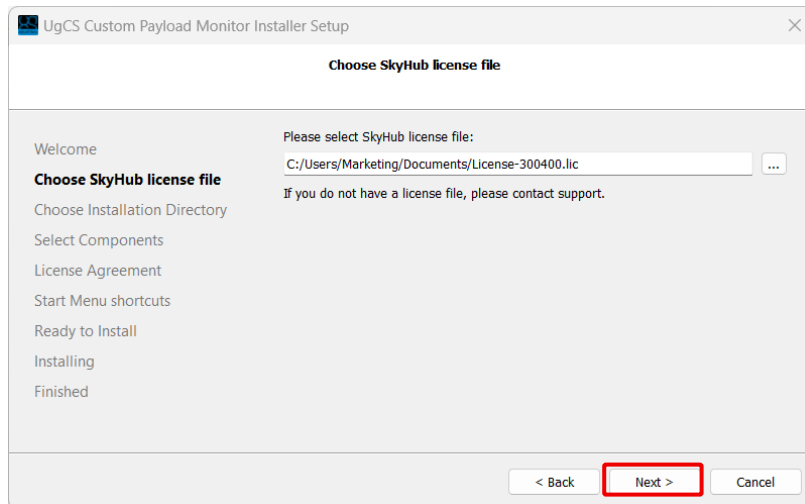


A file selection window will appear. Navigate to the license file, select it, and click “Open” to confirm.



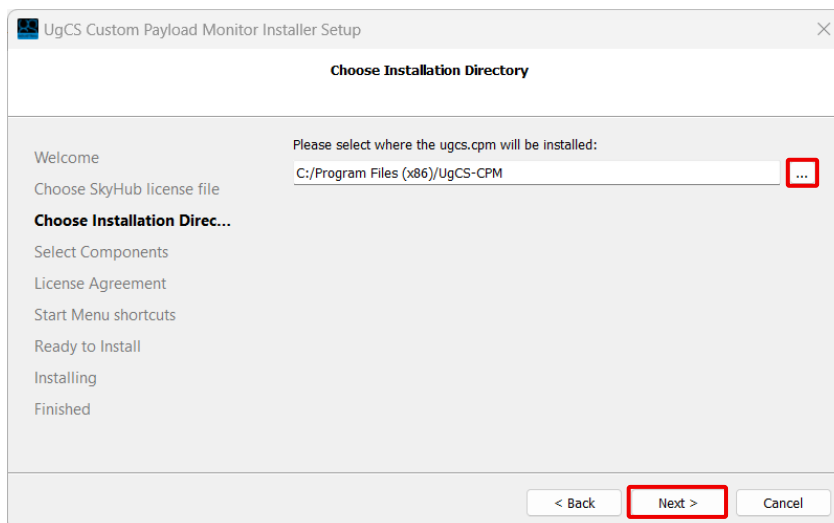
## Installation and Activation UgCS Payload Monitor

By clicking *Next*, you proceed to the next step.



Here you can specify the installation directory for the software. To change it, click the three-dot icon in the upper right corner and choose the desired folder. Usually, the default location is already appropriate.

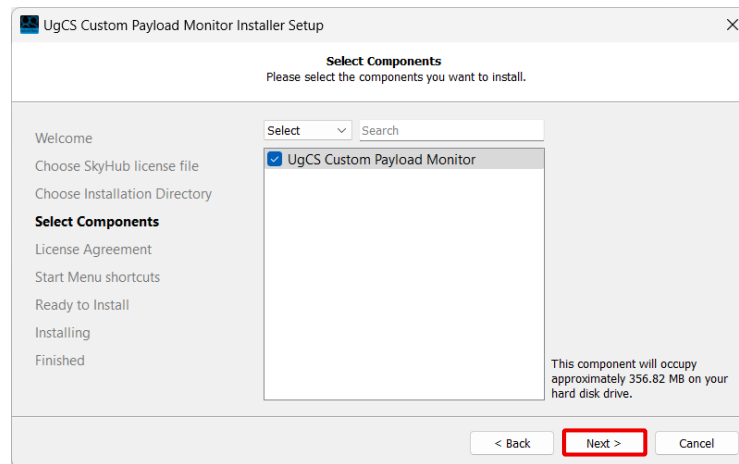
After selecting the installation folder, click *Next* to continue.



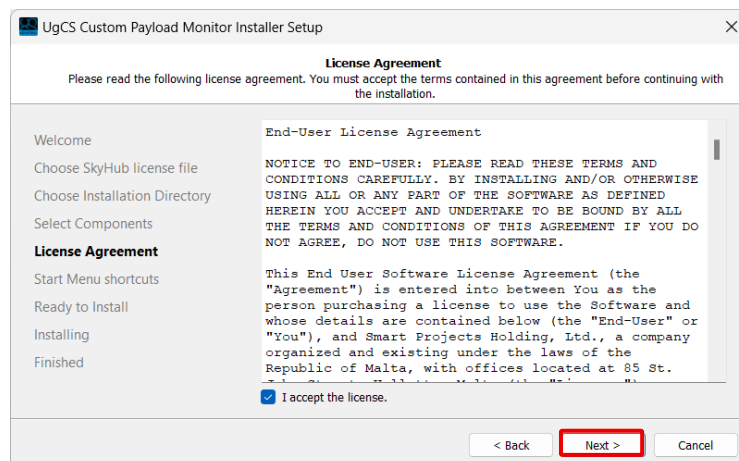
## Installation and Activation UgCS Payload Monitor

This window shows the size of the file that will be installed.

Click Next to continue.

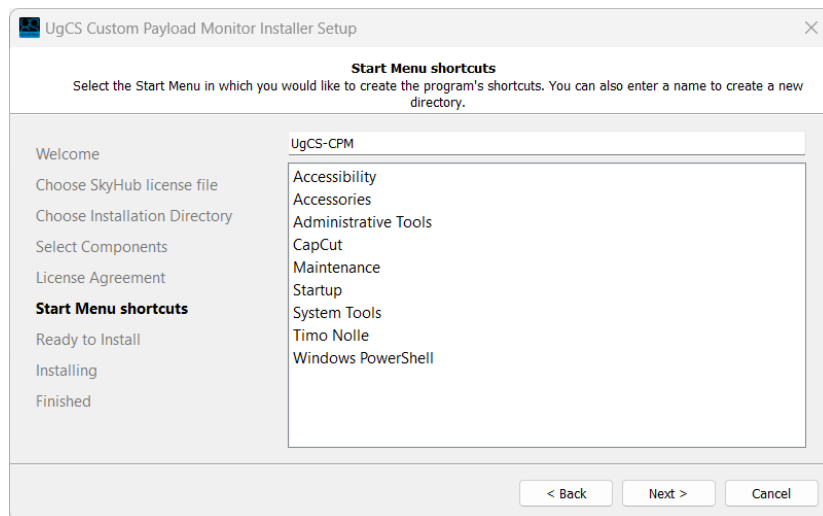


To proceed with the installation, you need to accept the License Agreement. Check the box to confirm, then click *Next* to continue.

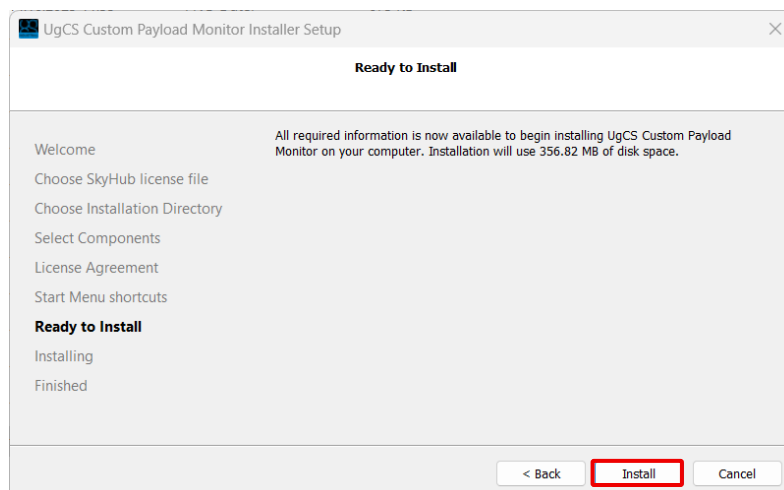


## Installation and Activation UgCS Payload Monitor

This step allows you to select shortcut options. As shortcuts are not necessary for the VEMOS AIR system, proceed by clicking *Next*.

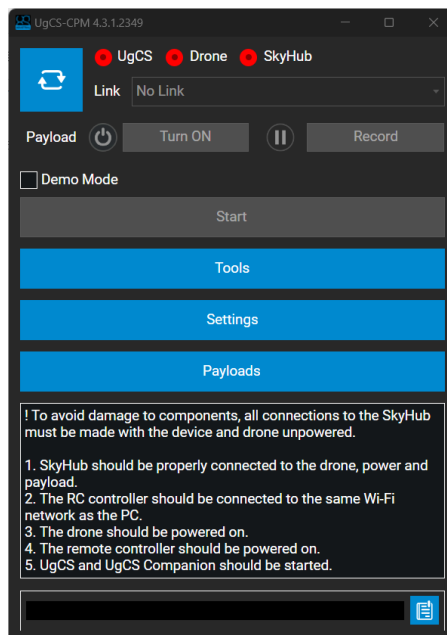
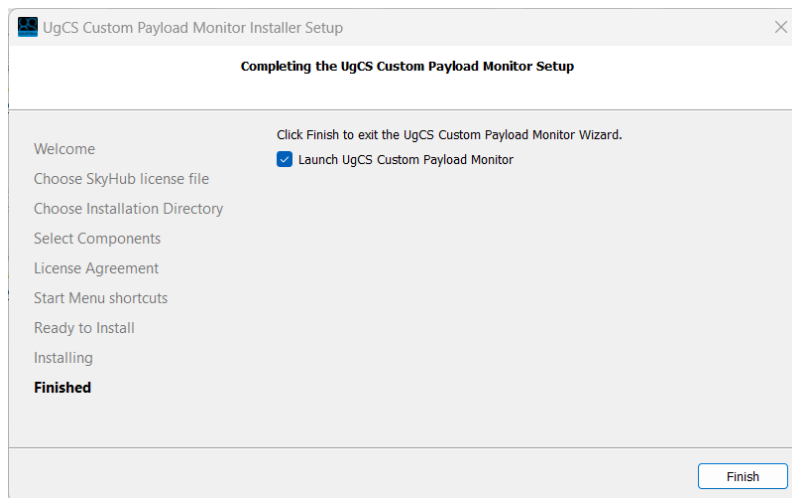


At this stage, the software is ready to be installed. Click *Install* to begin and wait for the installation to complete.



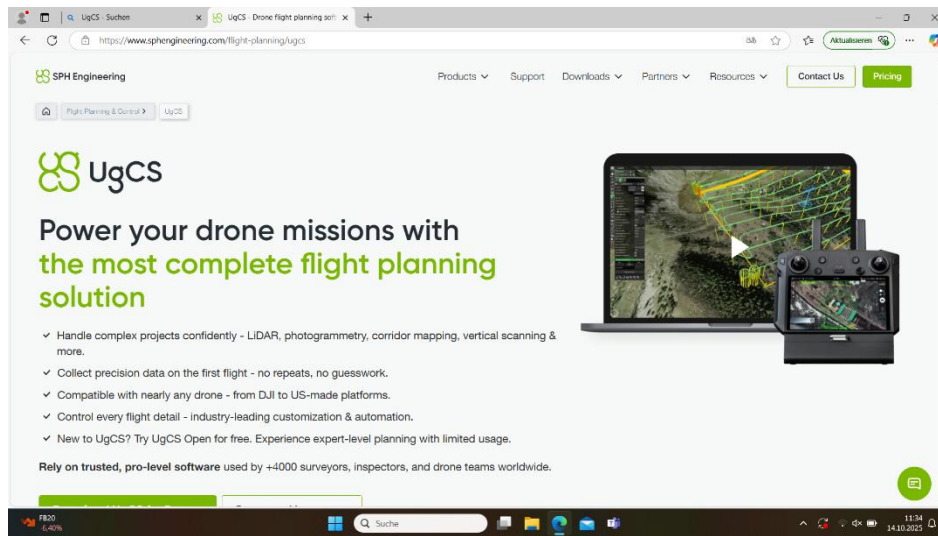
## Installation and Activation UgCS Payload Monitor

In the final window, click *Finish* to complete the installation. The program will launch automatically.

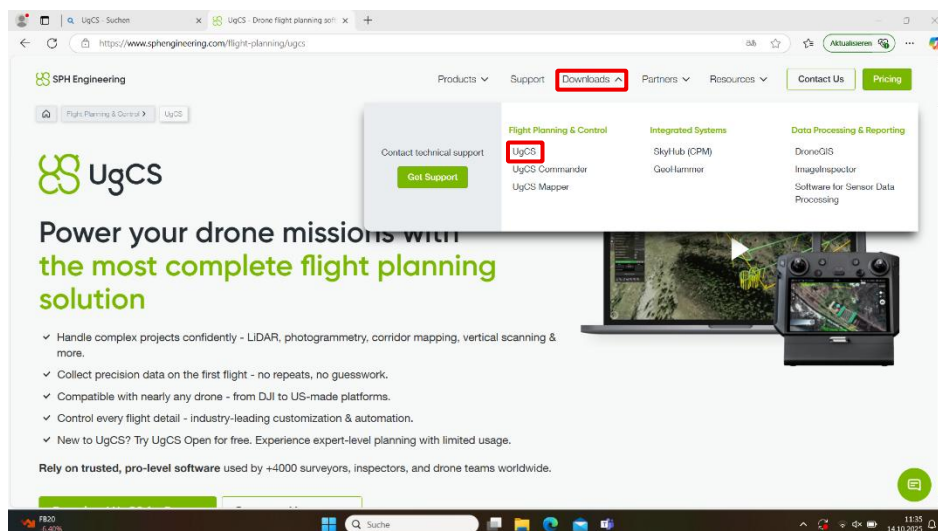


## Installation and Activation UgCS

Visit the website [www.sphengineering.com](http://www.sphengineering.com)



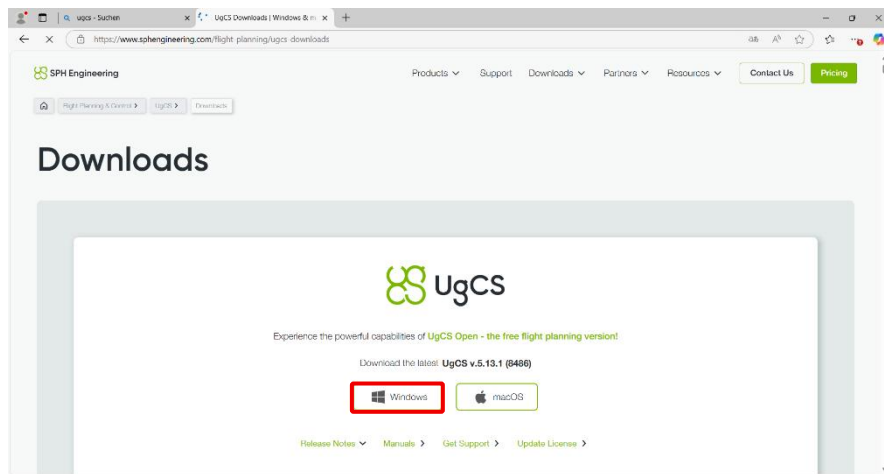
Navigate to “Downloads” and choose “SkyHub (CPM)”.



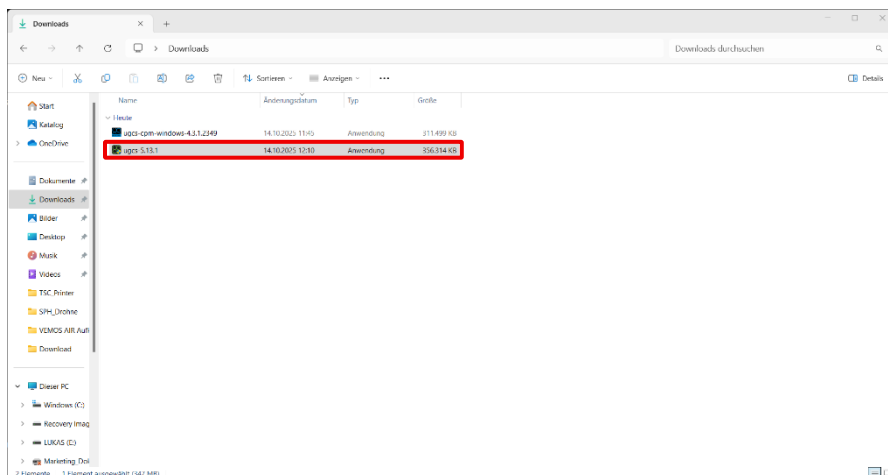


## Installation and Activation UgCS

Click the Windows icon. This action will initiate the software download.



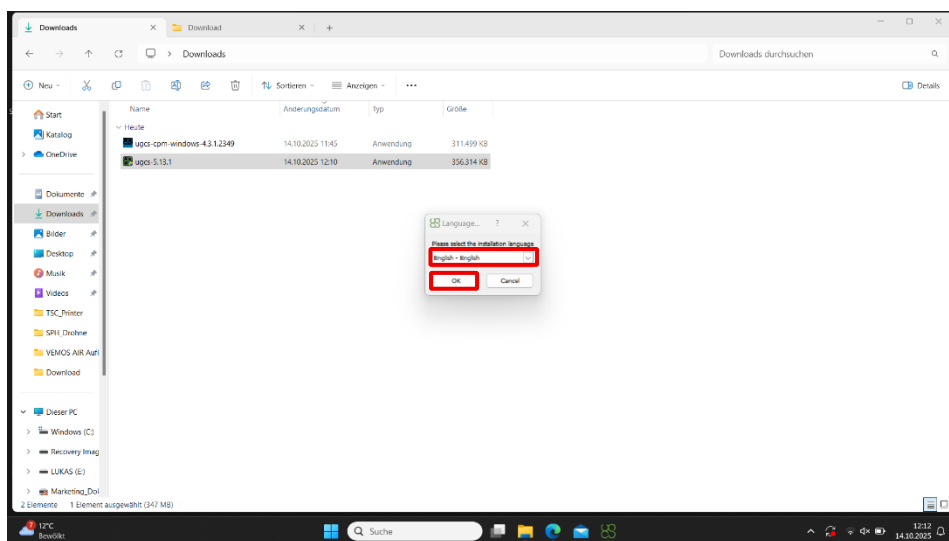
In the Downloads folder, you will find the file. Start it by double-clicking with the left mouse button.



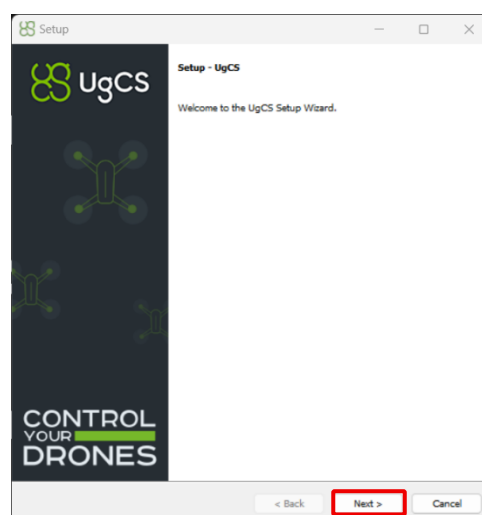
## Installation and Activation UgCS

The language selection window will now open.

Choose your preferred language and click OK to continue.

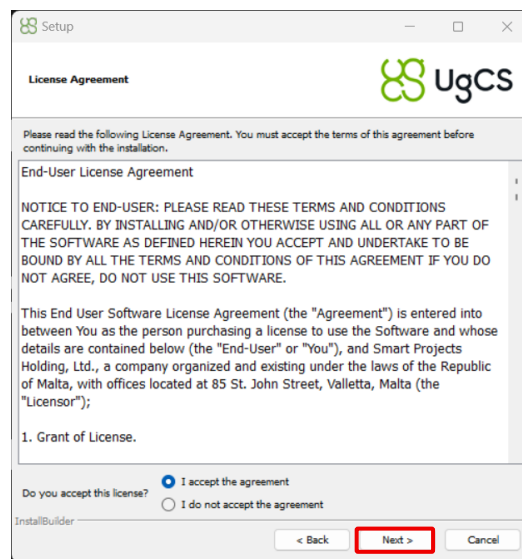


At this stage, the installation window opens. Click *Next* to proceed to the next step.



### Installation and Activation UgCS

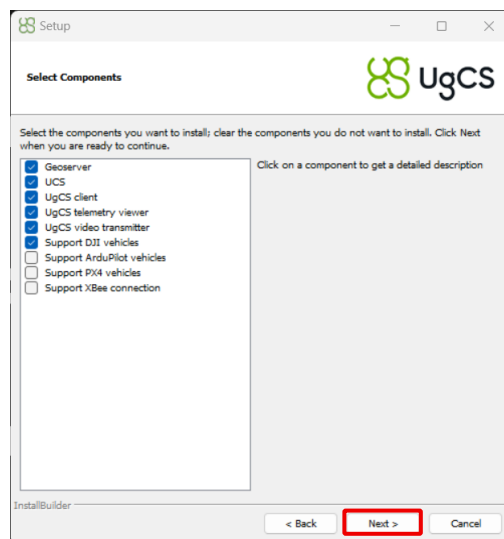
Confirm acceptance of the License Agreement and click *Next* to continue the installation process.



In this step, select the required add-ons.

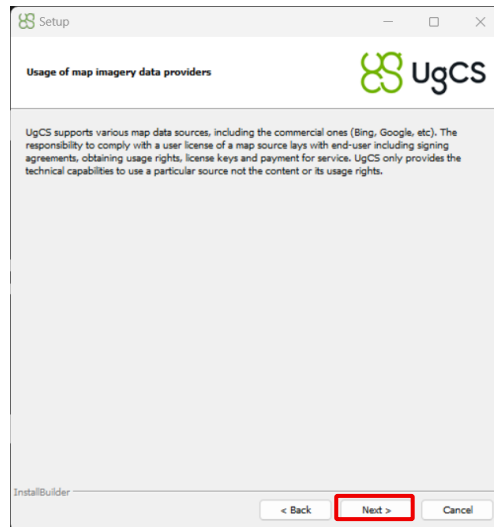
Make sure the following options are selected:

Geoserver, UCS, UgCS Client, UgCS Telemetry Viewer, UgCS Video Transmitter, and Support for DJI Vehicles.



## Installation and Activation UgCS

A notice about the usage of map imagery data providers will now be displayed. Click Next to continue.

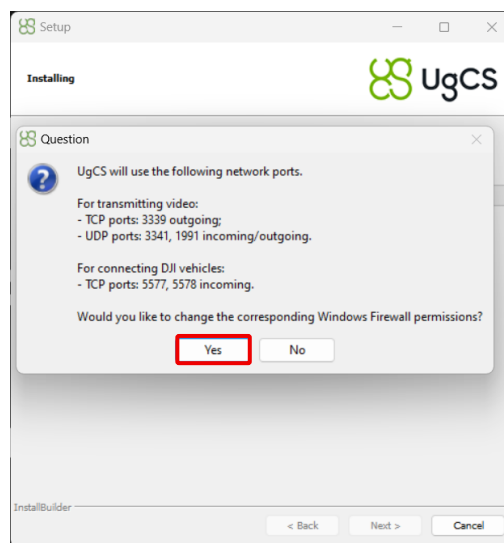


Click *Next* to begin the installation process.

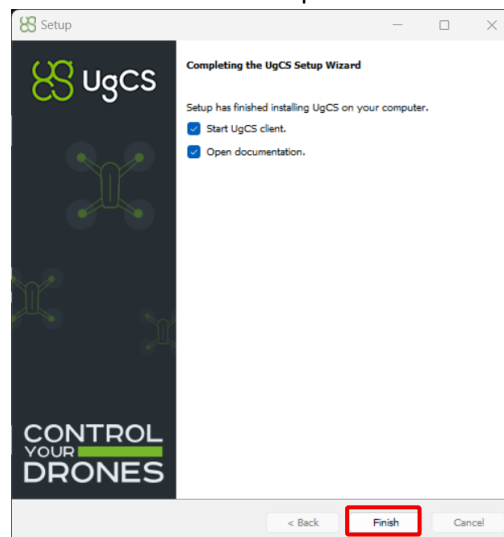


## Installation and Activation UgCS

A final message appears about the network ports that UgCS uses.

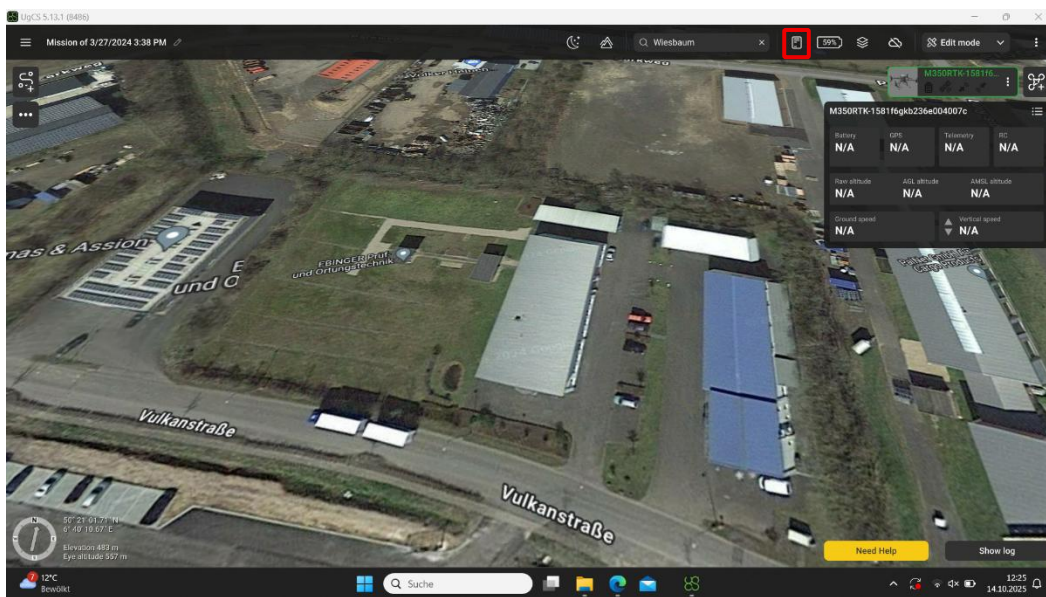


The final window confirms that the software has been successfully installed. Click *Finish* to complete the setup.

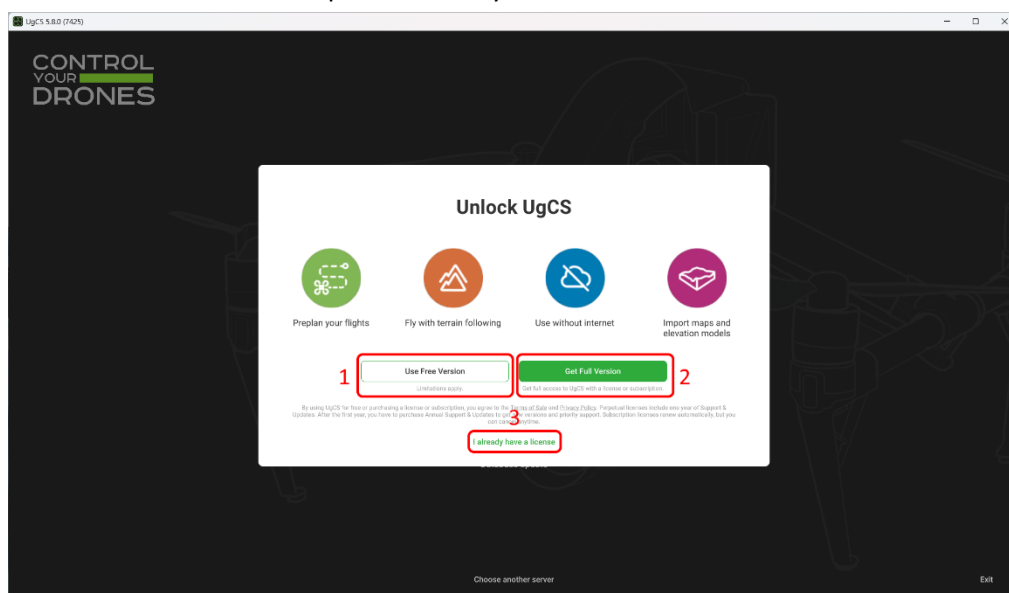


## Installation and Activation UgCS

Click the *License* symbol to open the activation window, then enter your license key to activate the software.

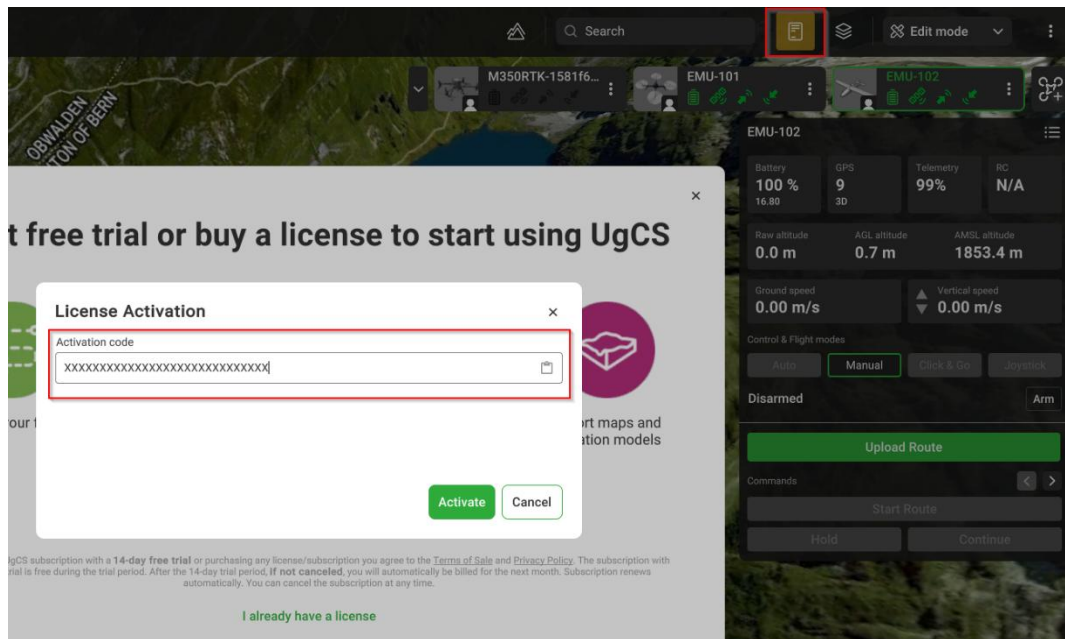


Point click point 3 when you have the Licence code

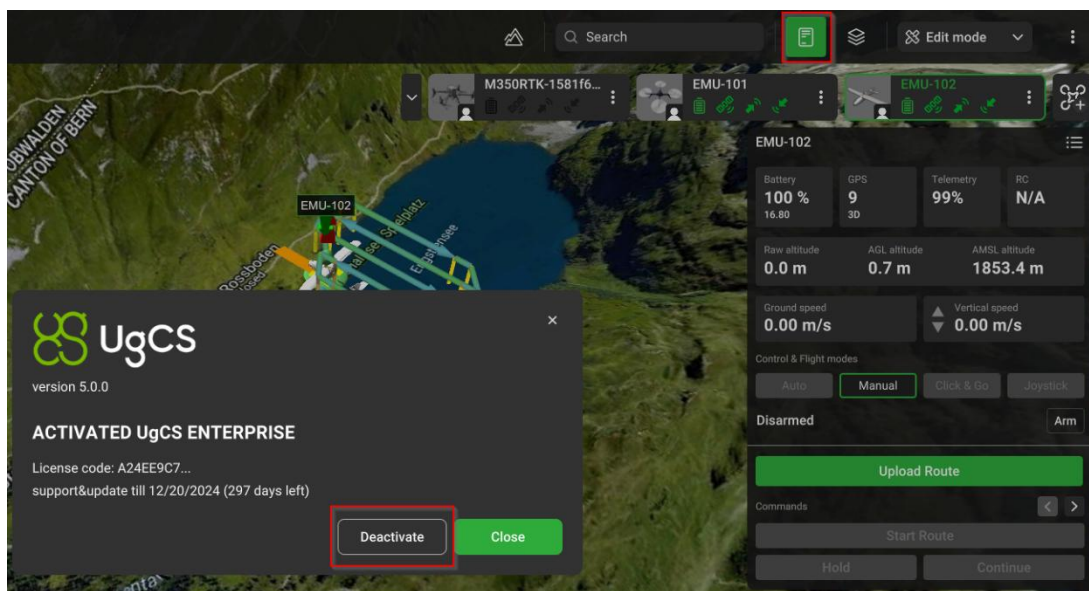


### Installation and Activation UgCS

In this window, enter your license key and click *Activate* to confirm.



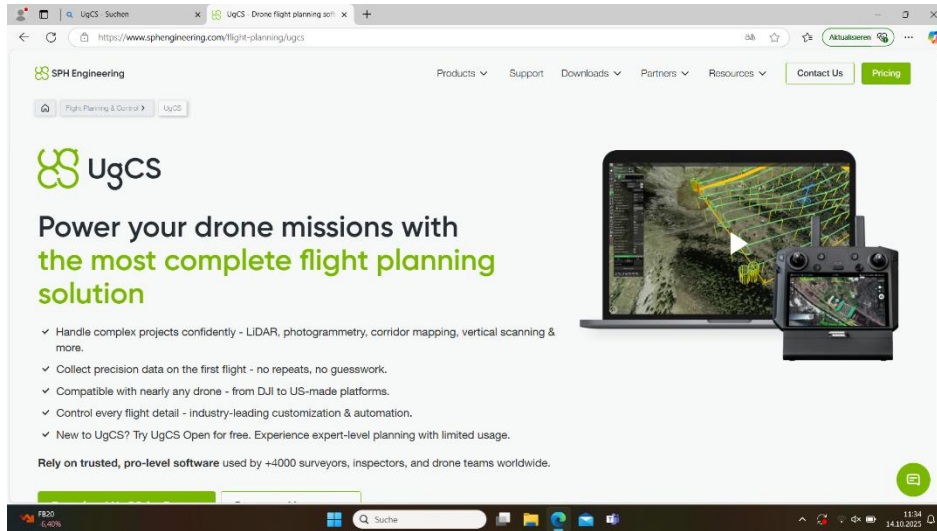
To deactivate the license, open this window and click the *Deactivate* button.



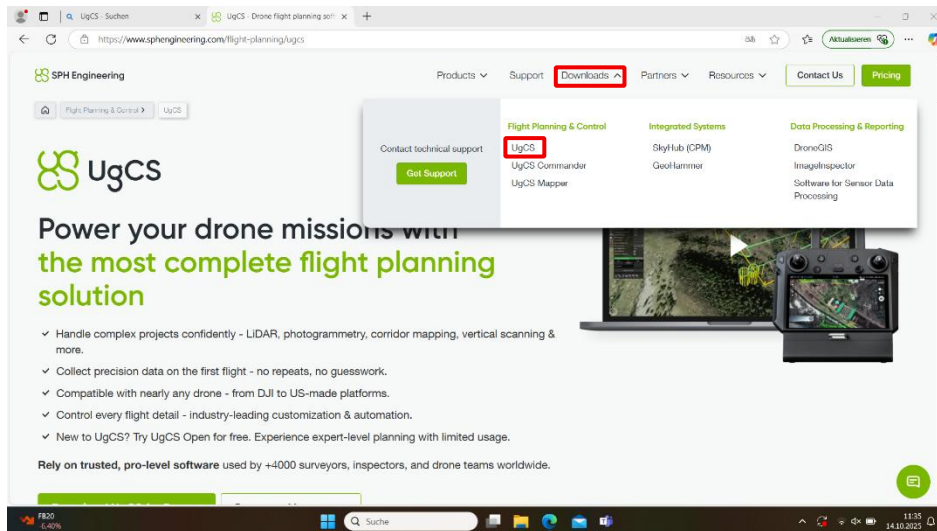


### Installation UgCS Companion

Visit with the DJI Remote Controller on the website [www.sphengineering.com](https://www.sphengineering.com)



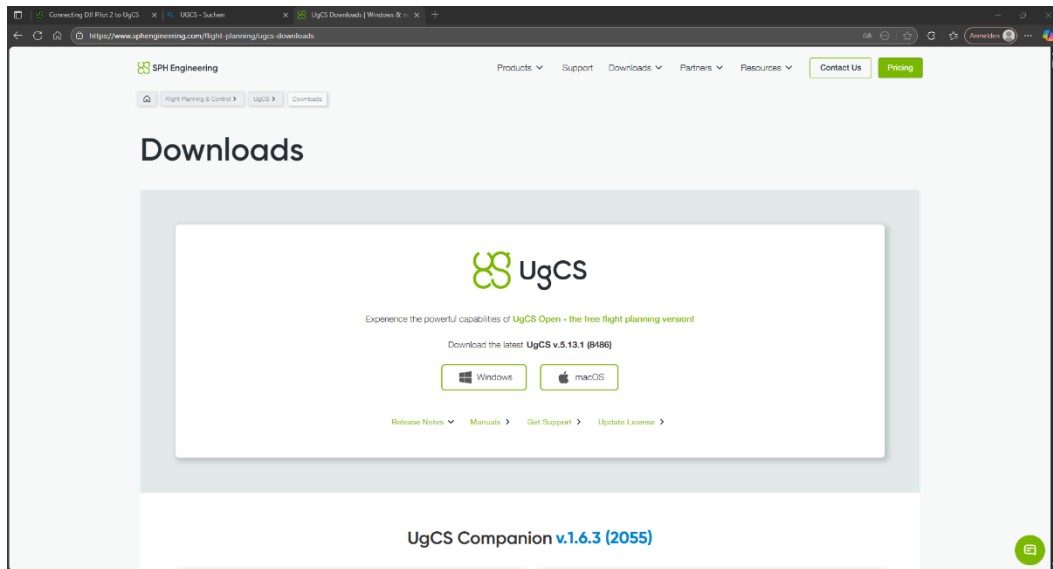
Navigate to “Downloads” and choose “UgCS”.



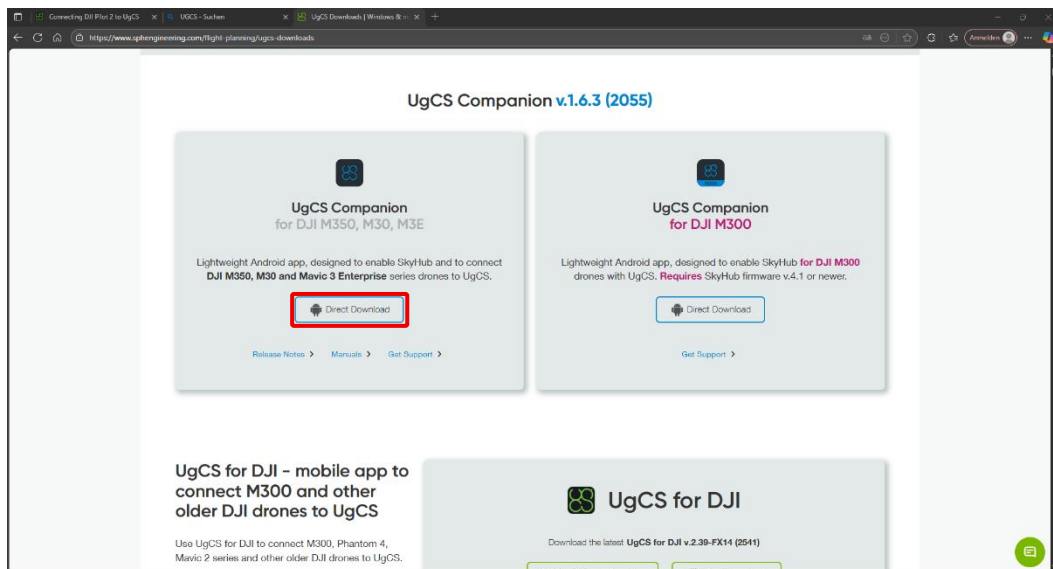


### Installation UgCS Companion

Scroll down to find the download link for *UgCS Companion*.

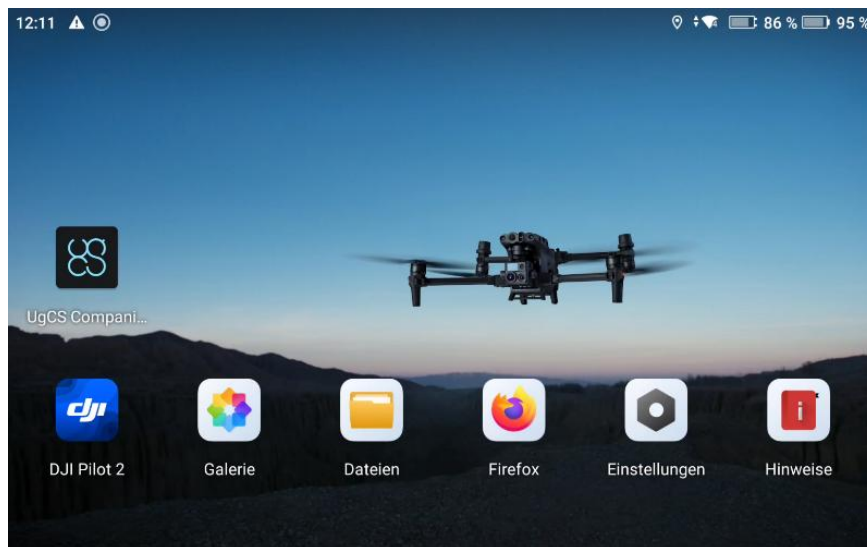


Click *Direct Download* under the section for the DJI M350 drone.

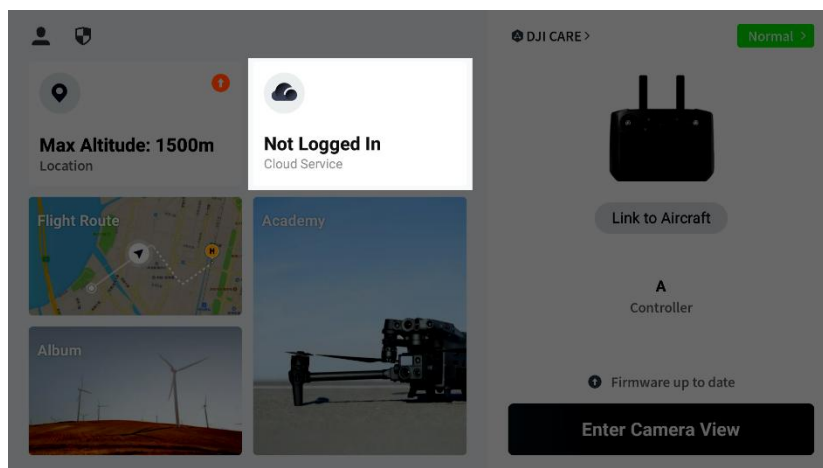


### Installation UgCS Companion

The installation is complete, and the software is ready to be opened.

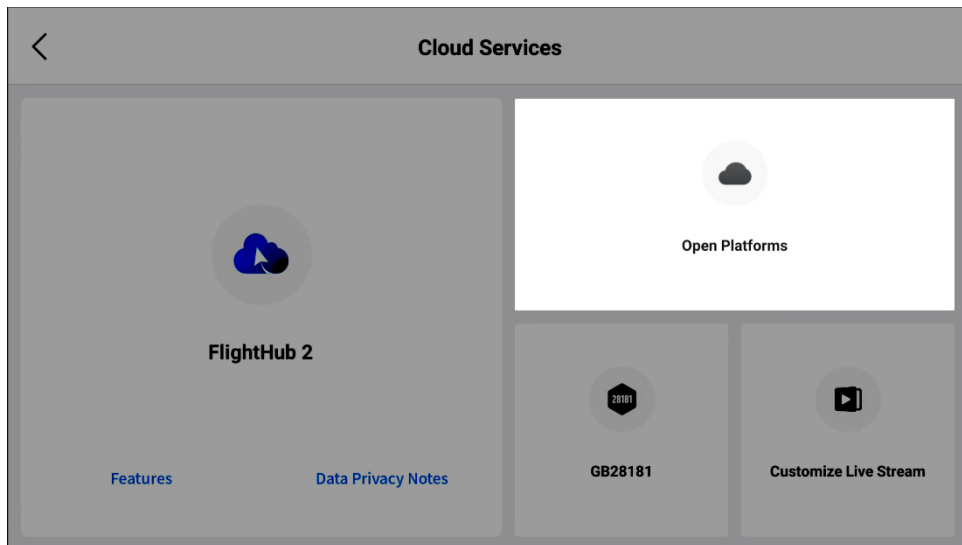


To establish a connection between *UgCS* and *UgCS Companion*, open *DJI Pilot 2* on the controller and select *Cloud Service*.



## Installation UgCS Companion

In the opened window click “Open Platforms”.

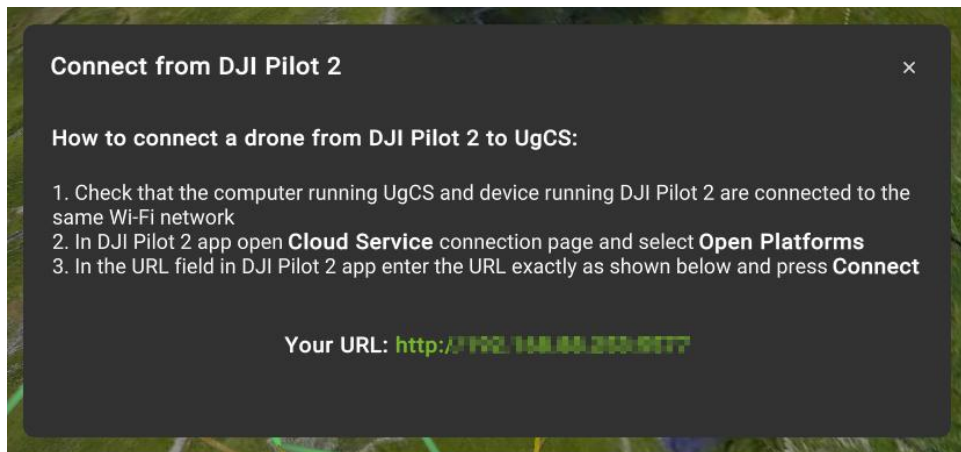


Return to the UgCS Desktop application, click the “Add vehicle button” and select “Connect from DJI Pilot 2”.

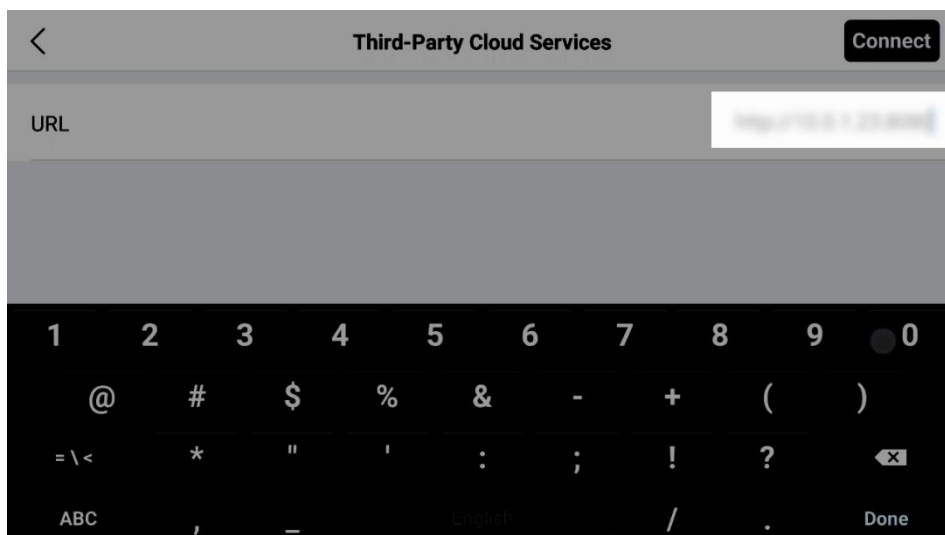


### Installation UgCS Companion

Displayed URL will be needed in the next step.

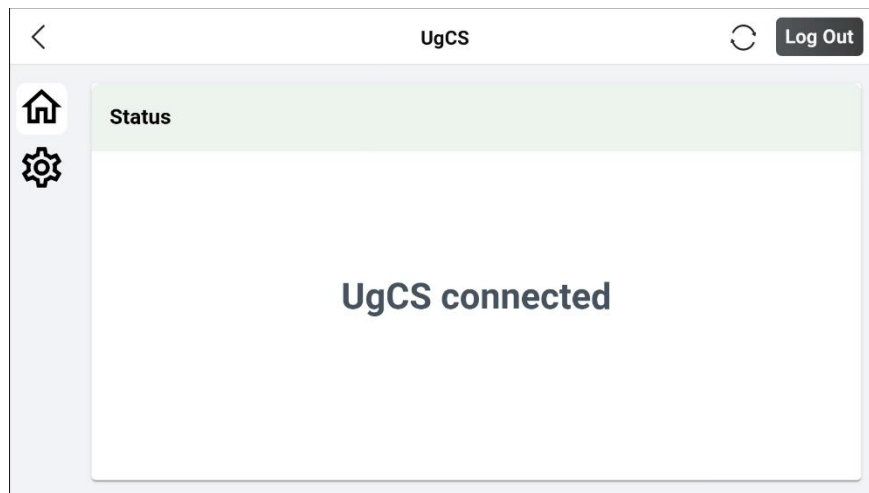


Return to the DJI Pilot 2, enter the URL from the UgCS Desktop, and click "Connect".

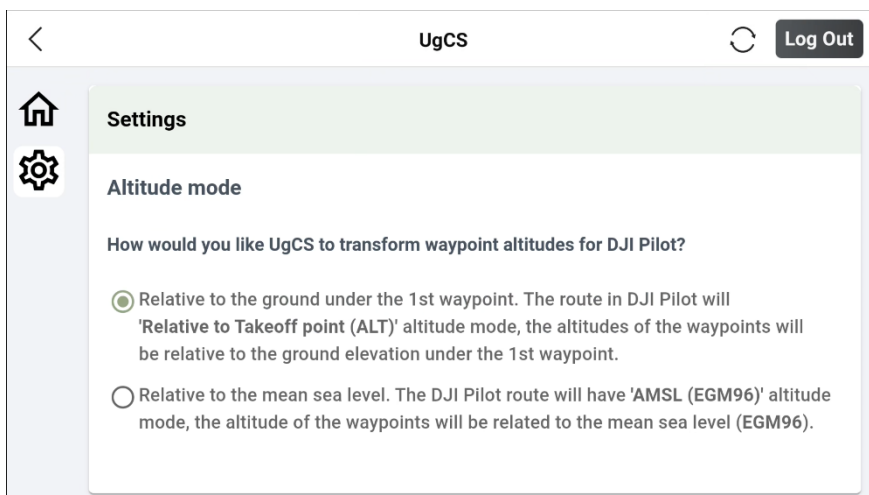


### Installation UgCS Companion

Wait until DJI Pilot 2 is connected to the UgCS Desktop.



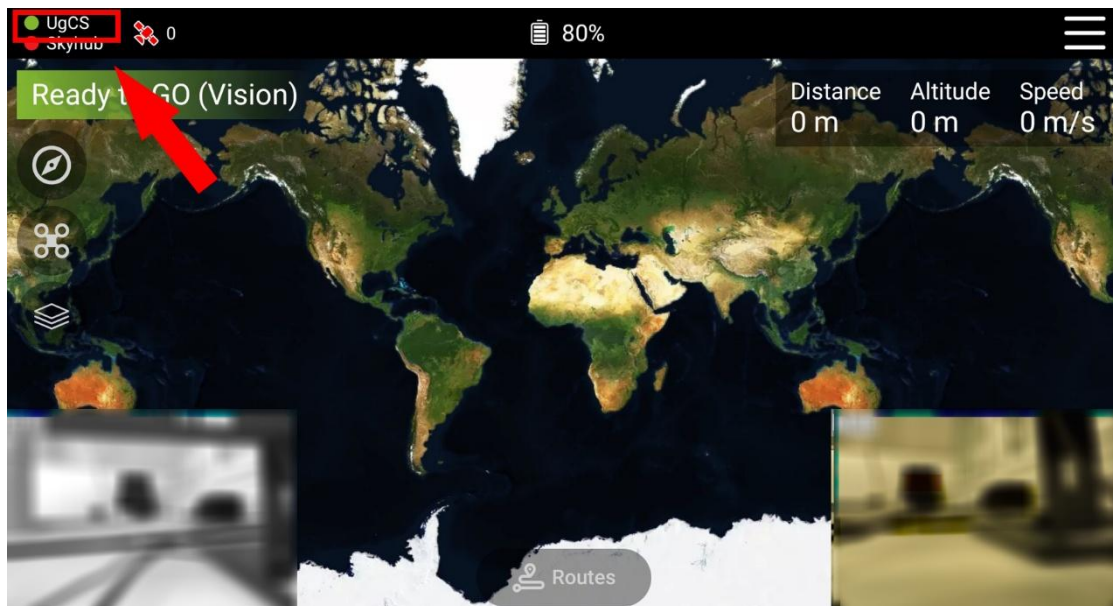
Select the Altitude mode.



## Installation UgCS Companion

Please follow these steps to connect the UgCS Companion and UgCS desktop applications:

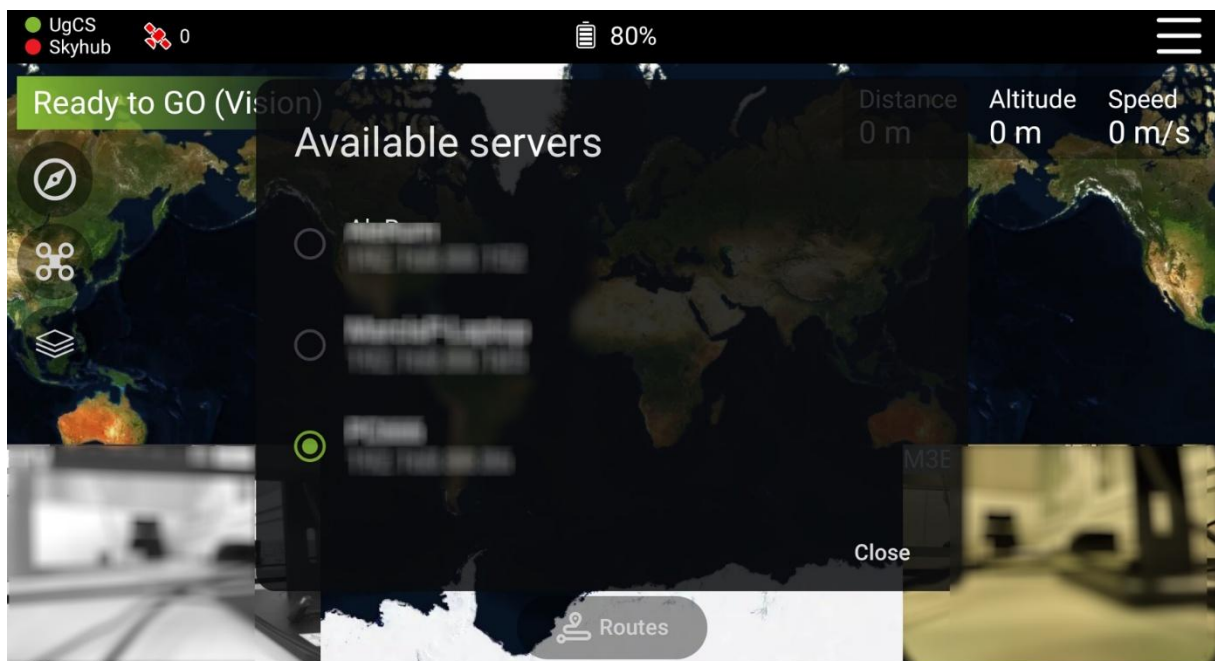
- Launch UgCS Desktop;
- Power on the drone;
- Power on the remote controller;
- Launch the UgCS Companion;
- The connection between two applications must be established automatically. This will be confirmed in the UgCS Companion, which will display a green indicator next to “UgCS” (the application status bar).



## Installation UgCS Companion

If the connection wasn't automatically established to the correct UgCS Server, it is possible to select the right one manually:

- Tap the UgCS button at the upper left corner;
- Select the correct UgCS Server from the list.

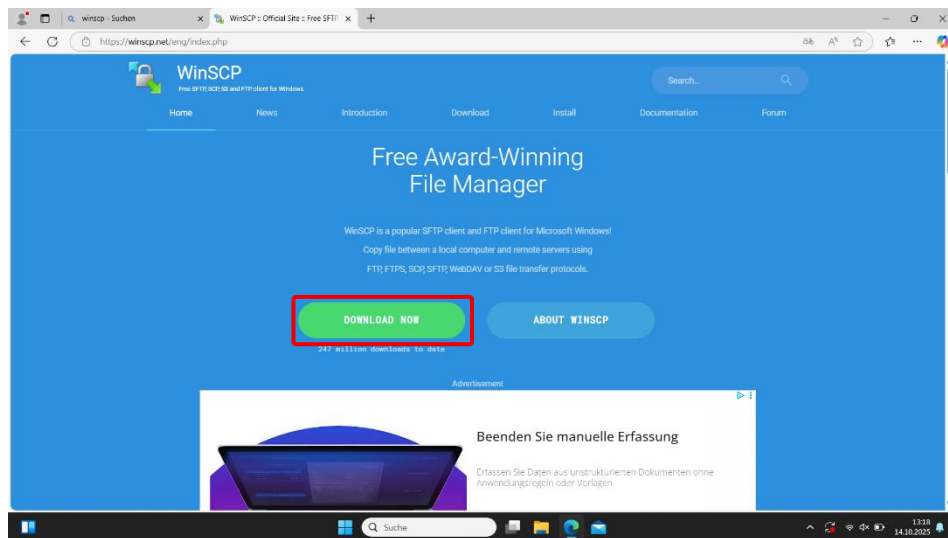


**NOTE:** Make sure that the computer with the UgCS Desktop and the remote controller are connected to the same local Private network and that there are no restrictions with the firewall/antivirus or any other system on your computer.

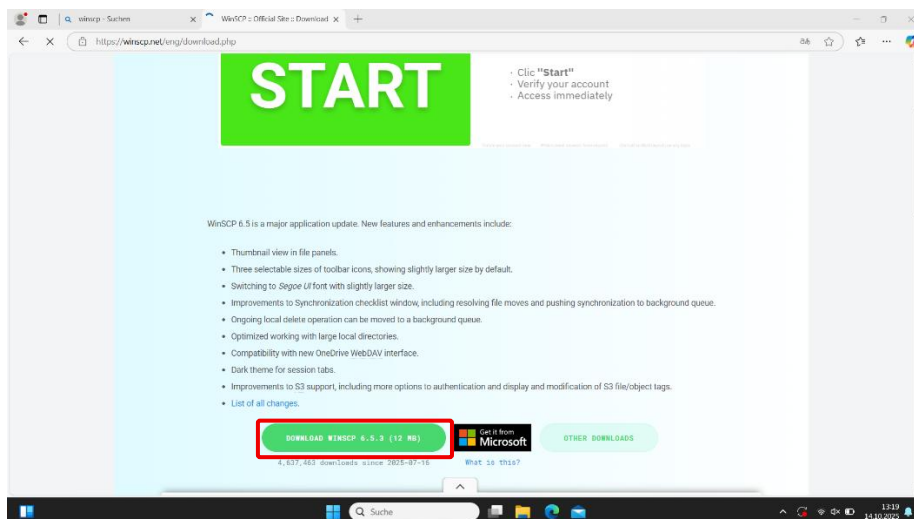


## Installation Win SCP

Go on the Website [winscp.net](https://winscp.net) and klick on Download now.



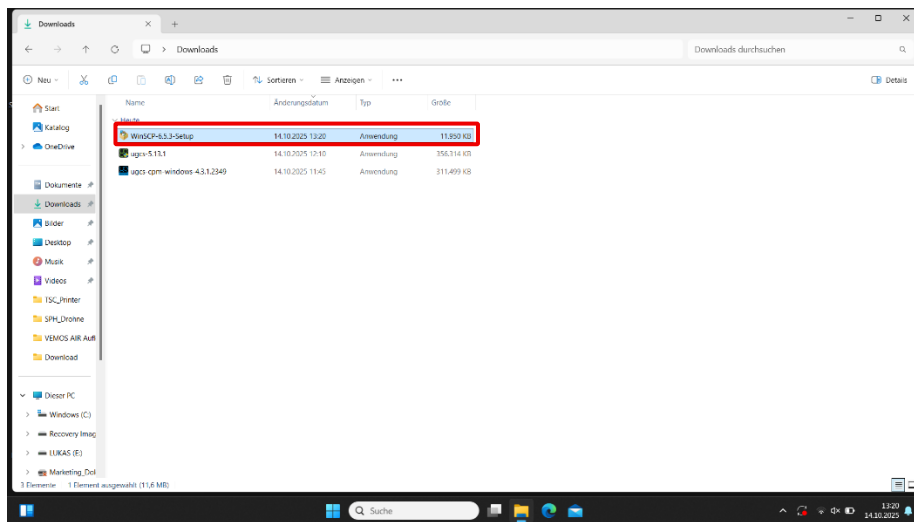
Click on *Download WinSCP* to start downloading the program.



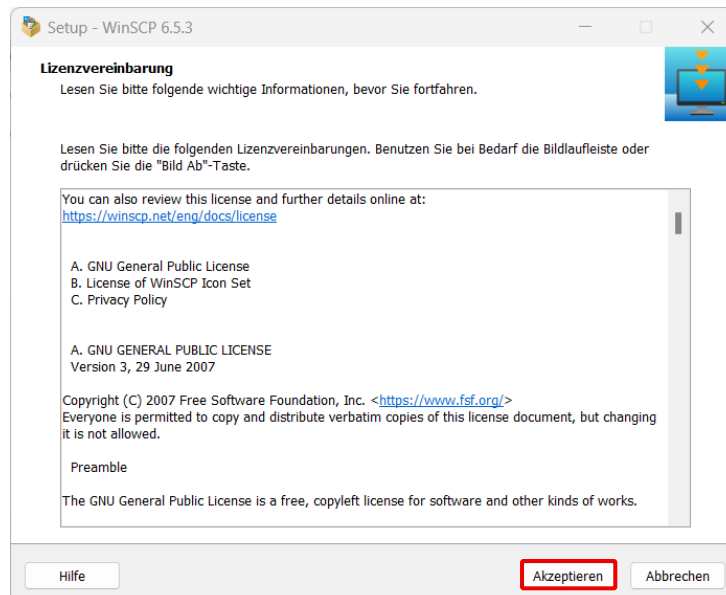


## Installation Win SCP

In the Downloads folder, you will find the file. Start it by double-clicking with the left mouse button.

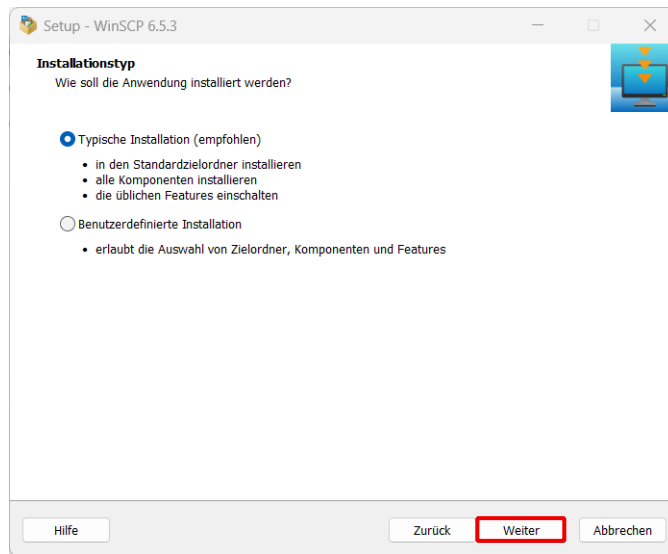


Before the download begins, you need to accept the WinSCP license agreement.

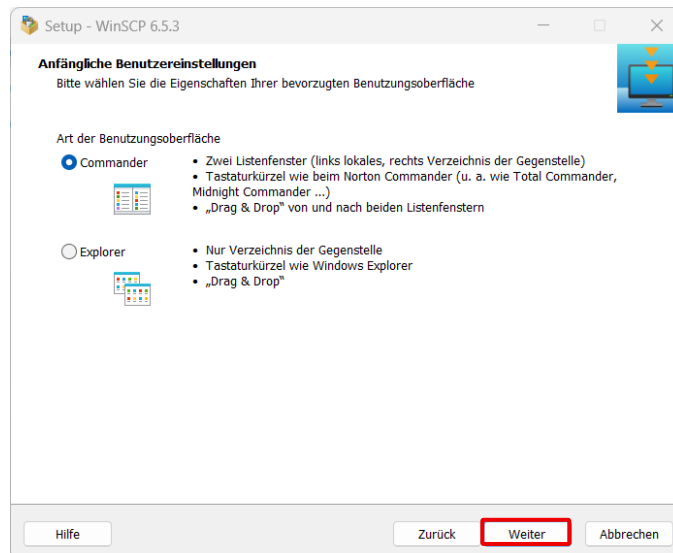


## Installation Win SCP

Choose *Typical Installation* and click *Next* to continue.



Select *Commander* as the interface type, then click *Next* to continue.

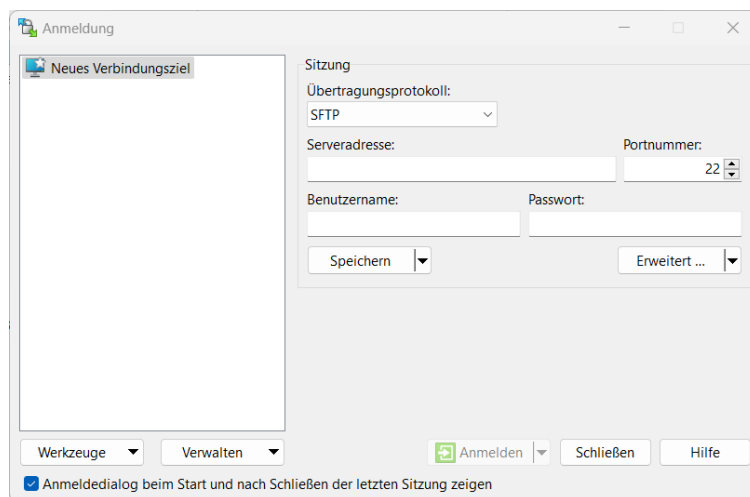


### Installation Win SCP

Click *Finish* to finalize the installation process.



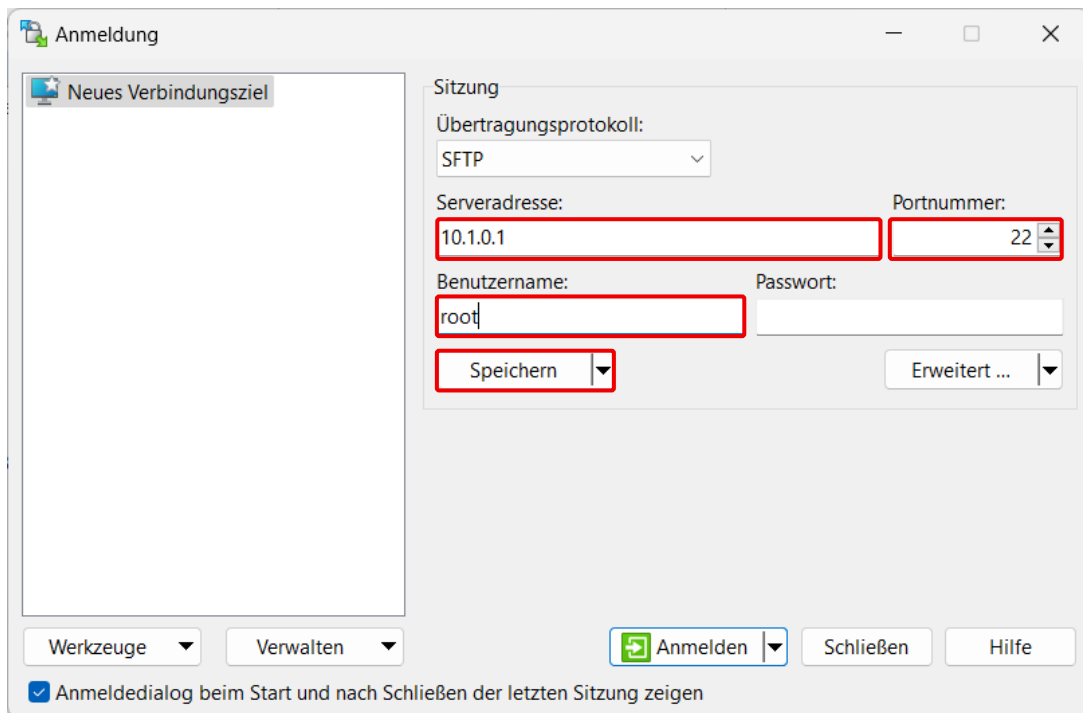
After completing the installation, WinSCP will automatically open.



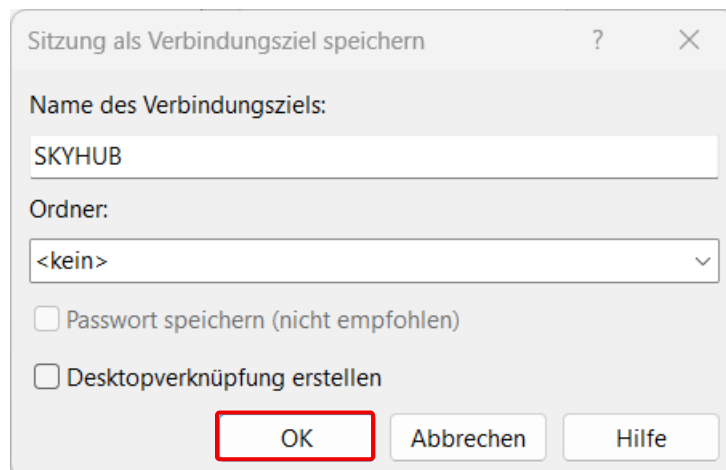
### Installation Win SCP

Enter the appropriate values into the highlighted fields.

Then choose Save to Save the Settings in the left field

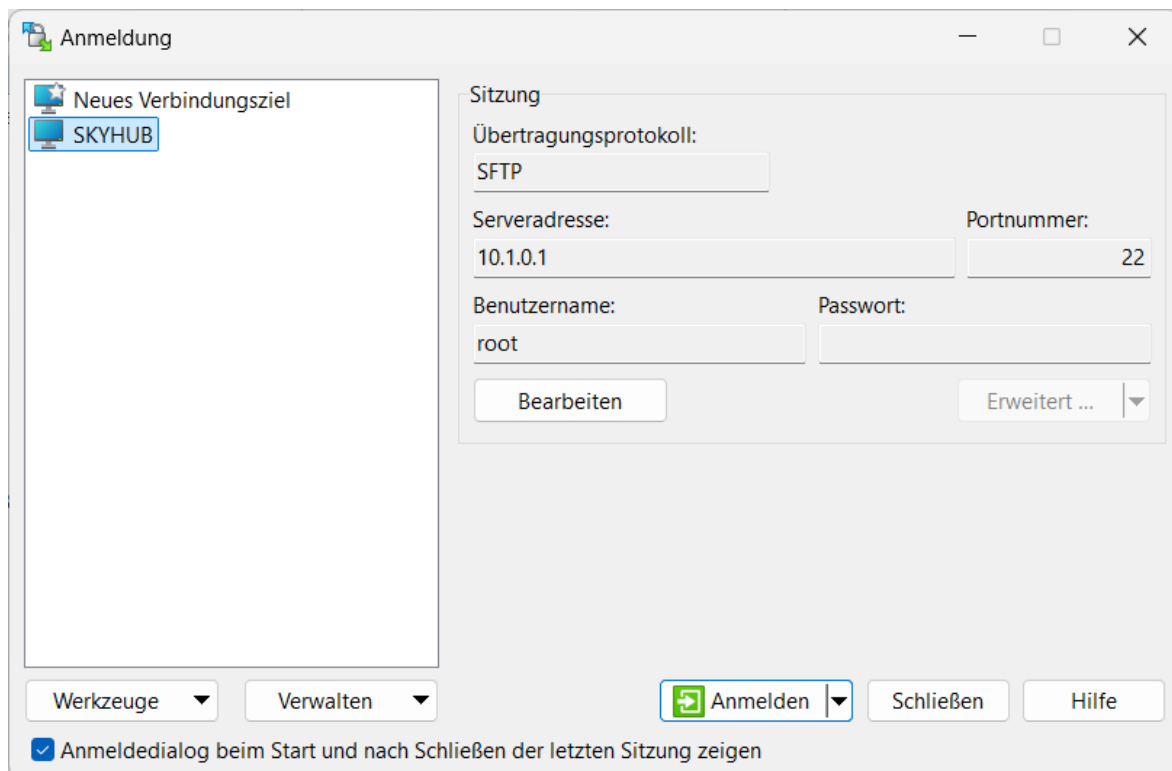


A dialog box appears allowing you to save your settings, for example under the name *SkyHub*. Click *OK* to confirm.



## Installation Win SCP

You will now see *SkyHub* listed on the left side. The software is now ready for use.



Anmeldung

Neues Verbindungsziel  
SKYHUB

Sitzung

Übertragungsprotokoll:  
SFTP

Serveradresse: 10.1.0.1 Portnummer: 22

Benutzername: root Passwort:

Bearbeiten Erweitert ...

Werkzeuge Verwalten Anmelden Schließen Hilfe

☒ Anmeldedialog beim Start und nach Schließen der letzten Sitzung zeigen



## Flight Preparation

### VEMOS® AIR / DJI MATRICE 350RTK

#### **VEMOS® AIR Flight Preparation**

- VEMOS® AIR System
- UgCS

## Drone Start

Press the start button once short, once long.



## Controller Start

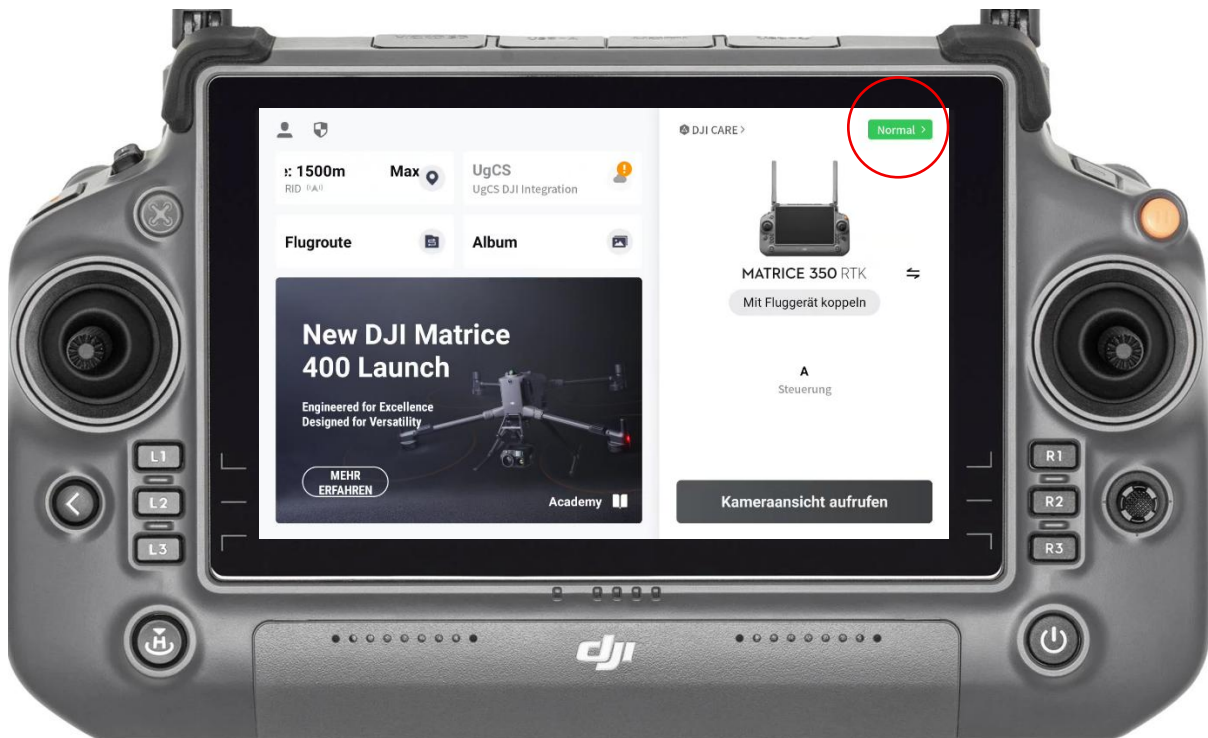
Press the start button once short, once long.





### Drone Check

If “Normal” is not displayed at the top right of the tab: Click on the tab and check where the error is coming from.



### Start UgCS Companion

Swipe up from the bottom edge of the display in DJI Pilot 2 to close the application and return to the home screen. From there, tap the UgCS Companion application to launch it.



### Status of connections

In the UgCS Companion application, two indicators provide information about the connection status. These are located in the top left corner and display either green or red, depending on the status.

UgCS: Connection to the computer.

SKYHUB: Connection to the SKYHUB on the drone

Red: Connection interrupted

Green: Connection OK



### Computer preparation

When working with a single screen, we open the „UgCS Payload Monitor“ (Blue) and place it on the left half of the screen. Then, we open „UgCS“ (Green) and position it on the right half to maintain a clear overview of all relevant data.





### Checking connections

In the “UgCS Payload Monitor,” (Blue) you can see three dots that appear in red, yellow, or green.

Red: the respective device is not connected.

Yellow: the respective device has a problem.

Green: the respective device is connected.

On the right side of the UgCS interface, the drone’s connection status is also displayed.



### Error prevention

#### Connecting All Systems (All Status Indicators Green)

To ensure that all systems are properly connected and all status indicators in *UgCS* appear green, please check the following points:

##### SkyHub

- The USB-C cable between the drone and the SkyHub is properly connected.
  - USB-C connector fully inserted
  - Red connector plugged into the corresponding socket
  - 2-pin connector plugged into the “PWR IN” port

##### Drone

- The drone is correctly paired with the remote controller.

##### UgCS

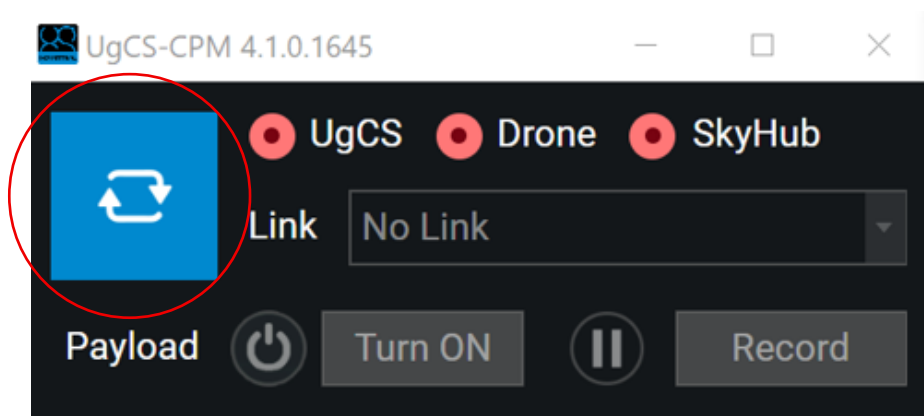
- The computer and the remote controller are connected to the **same network**.

#### ⚠ Important:

The **LiDAR cable** must be connected **before powering on the drone!**

#### UgCS Payload Monitor

- After startup, press the **Refresh** button to verify the connection.



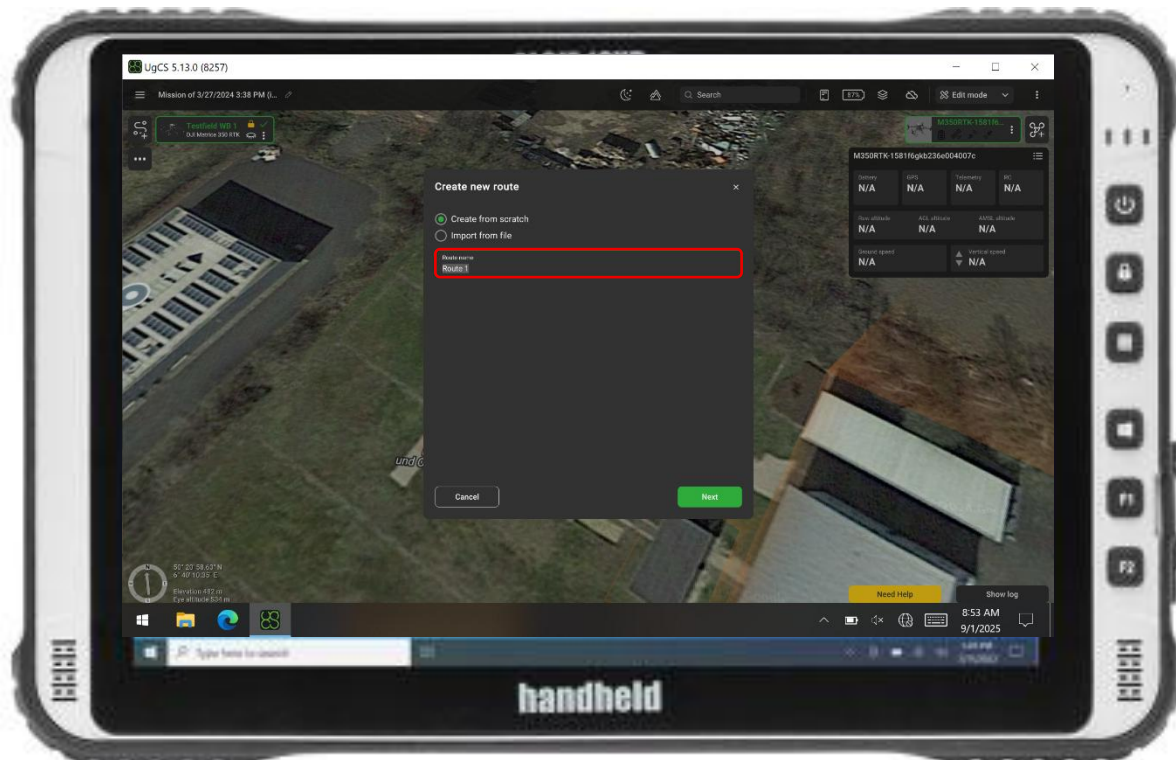
### Route anlegen

Click the button with the line and plus sign in the top left corner to create a route.



### Name the route

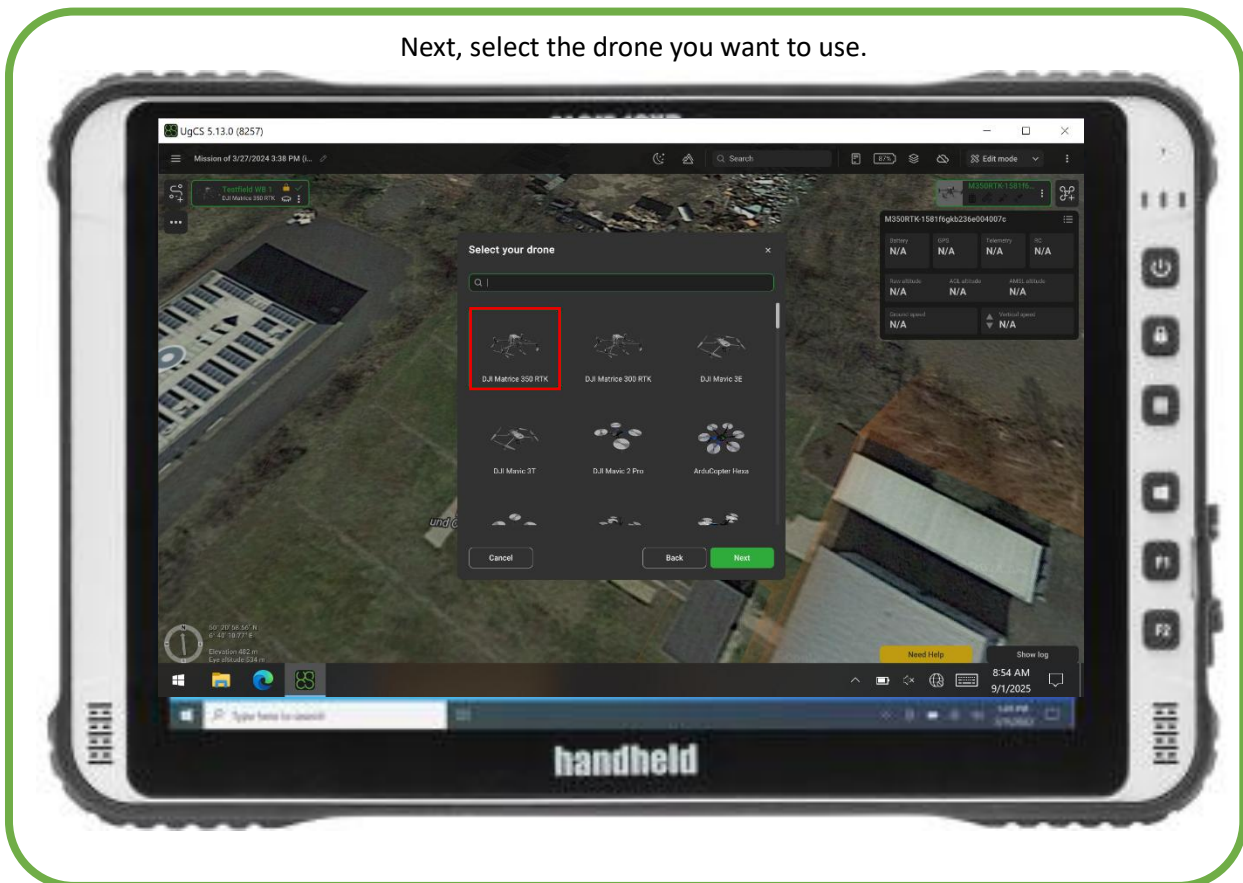
A window will open, allowing you to assign a name to the route.





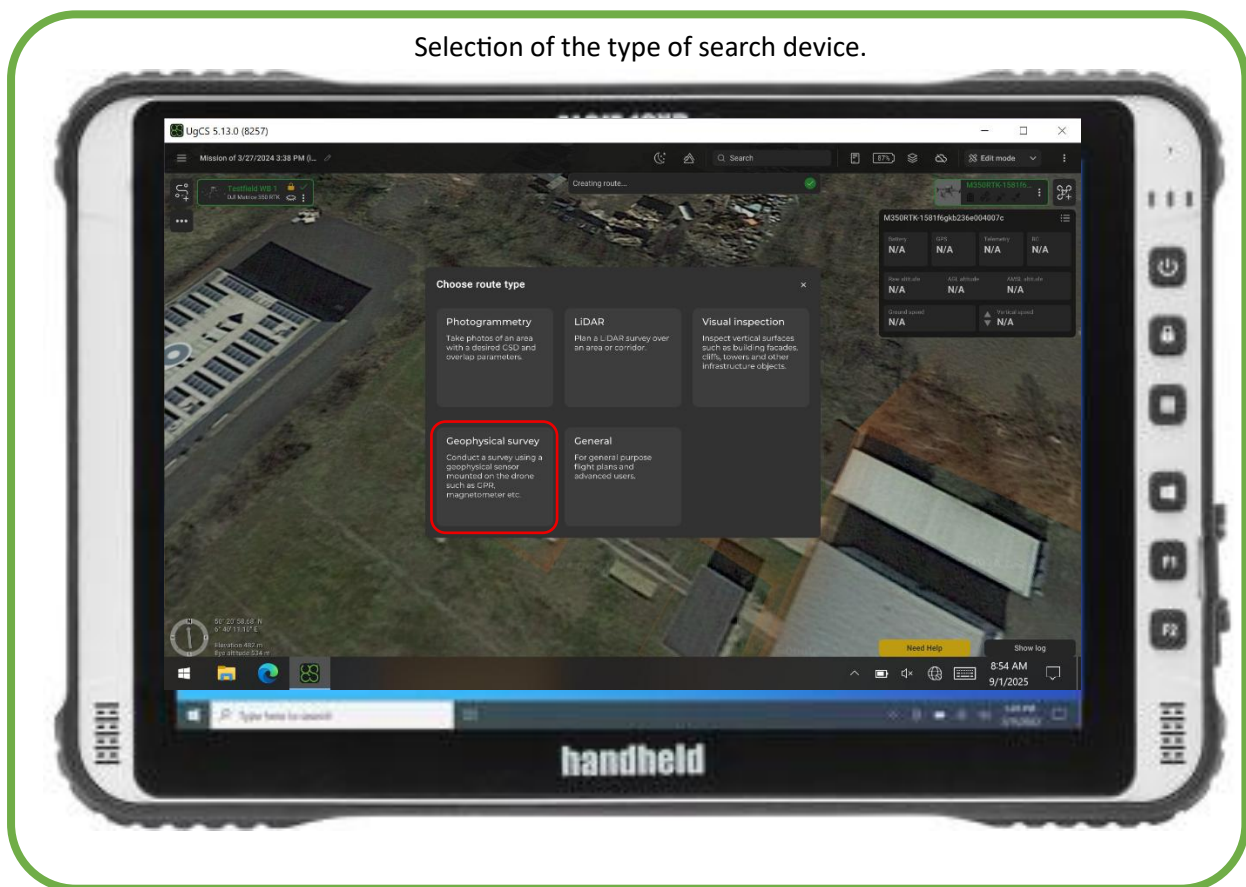
### Drone selection

Next, select the drone you want to use.



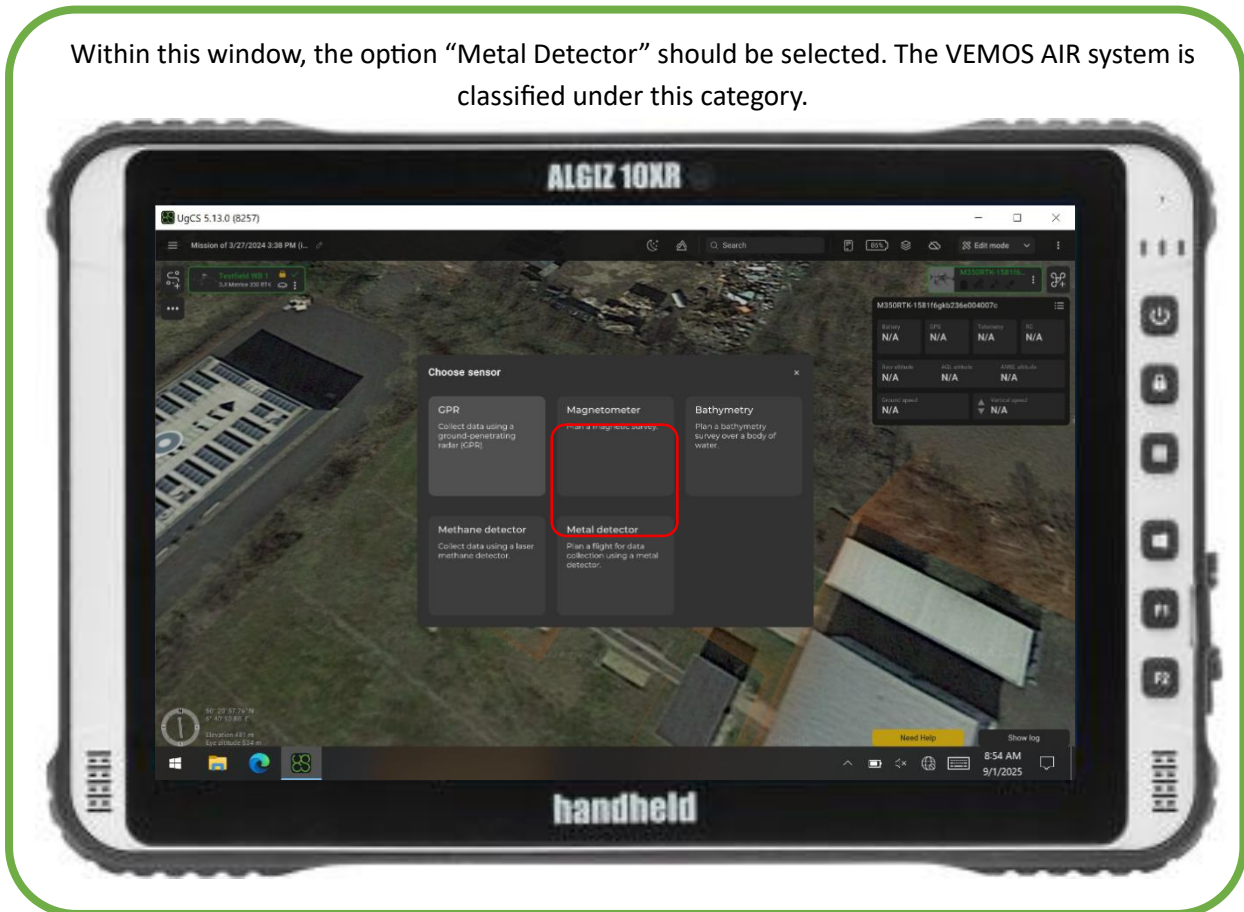
### Search device type selection

Selection of the type of search device.



### Sensor selection

Within this window, the option “Metal Detector” should be selected. The VEMOS AIR system is classified under this category.



### Create search field

A corner point is set by double clicking on the field.

Subsequently, all necessary corner points are placed on the map and confirmed with the Enter key.





### Editing corner points

The search field can be modified by clicking and dragging the corner points. Alternatively, coordinates can be entered manually by selecting a corner and providing latitude and longitude values.



### Flight Settings

Set the following parameters in the Basic Settings:

- **Flight altitude:** 2.7 m – 3.1 m (optimum 2.9 m)
- **Flight speed:** 1 m/s – 1.5 m/s (optimum 1 m/s)
- **Lateral spacing:** 1 m

*Flight speed and altitude may be adjusted depending on the desired precision and the characteristics of the search field.*



### Flugeinstellungen

Set the following parameters in the Advanced Settings:

- **AGL Tolerance:** 0.3 m
- **Overshoot:** 1.5 m (Defines how far the drone flies beyond the search area. Ensures straight, complete flight lines.)
- **Recommended Overshoot Speed:** 0.5 m/s



### Create starting point

Select the icon marked with number 1 on the left panel to add a new starting point.  
Then click on the desired position on the map.





### Adjust starting point

Adjust the following parameters in the Basic Settings:

- **Altitude (AGL):** 5 m
- **Flight speed:** 0.5–1.5 m/s
- **Altitude mode:** AGL





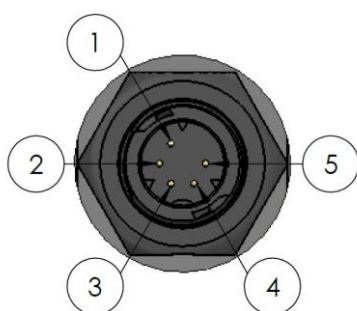
## Verkabelungsplan für das VEMOS® AIR Suchsystem

## Pin assignment „VEMOS® AIR“

### LiDAR Output

|       |     |
|-------|-----|
| PIN 1 | GND |
| PIN 2 | +5V |
| PIN 3 |     |
| PIN 4 | RX  |
| PIN 5 | TX  |

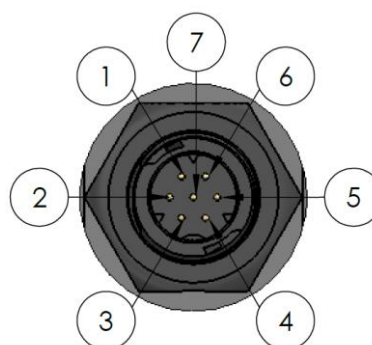
LiDAR



### Power + UART

|       |            |
|-------|------------|
| PIN 1 | GND 12V    |
| PIN 2 |            |
| PIN 3 | +12V Input |
| PIN 4 | RX         |
| PIN 5 | TX         |
| PIN 6 |            |
| PIN 7 |            |

POWER



## Pin assignment „SKYHUB“

|       |         |         |         |          |          |
|-------|---------|---------|---------|----------|----------|
| PIN 1 | GND     | GND     | GND     | GND      | GND      |
| PIN 2 | +5V     | +5V     | +5V     | +5V      | +5V      |
| PIN 3 | +12V    | +12V    | +12V    | +12V     | +12V     |
| PIN 4 | UART_TX | UART_TX | UART_TX | UART_TX  | UART_TX  |
| PIN 5 | UART_RX | UART_RX | UART_RX | UART_RX  | UART_RX  |
| PIN 6 | GPO18   | GPO7    | GPO17   | RS232_TX | RS232_TX |
| PIN 7 | GPI11   | GPI23   | GPI27   | RS232_RX | RS232_RX |

