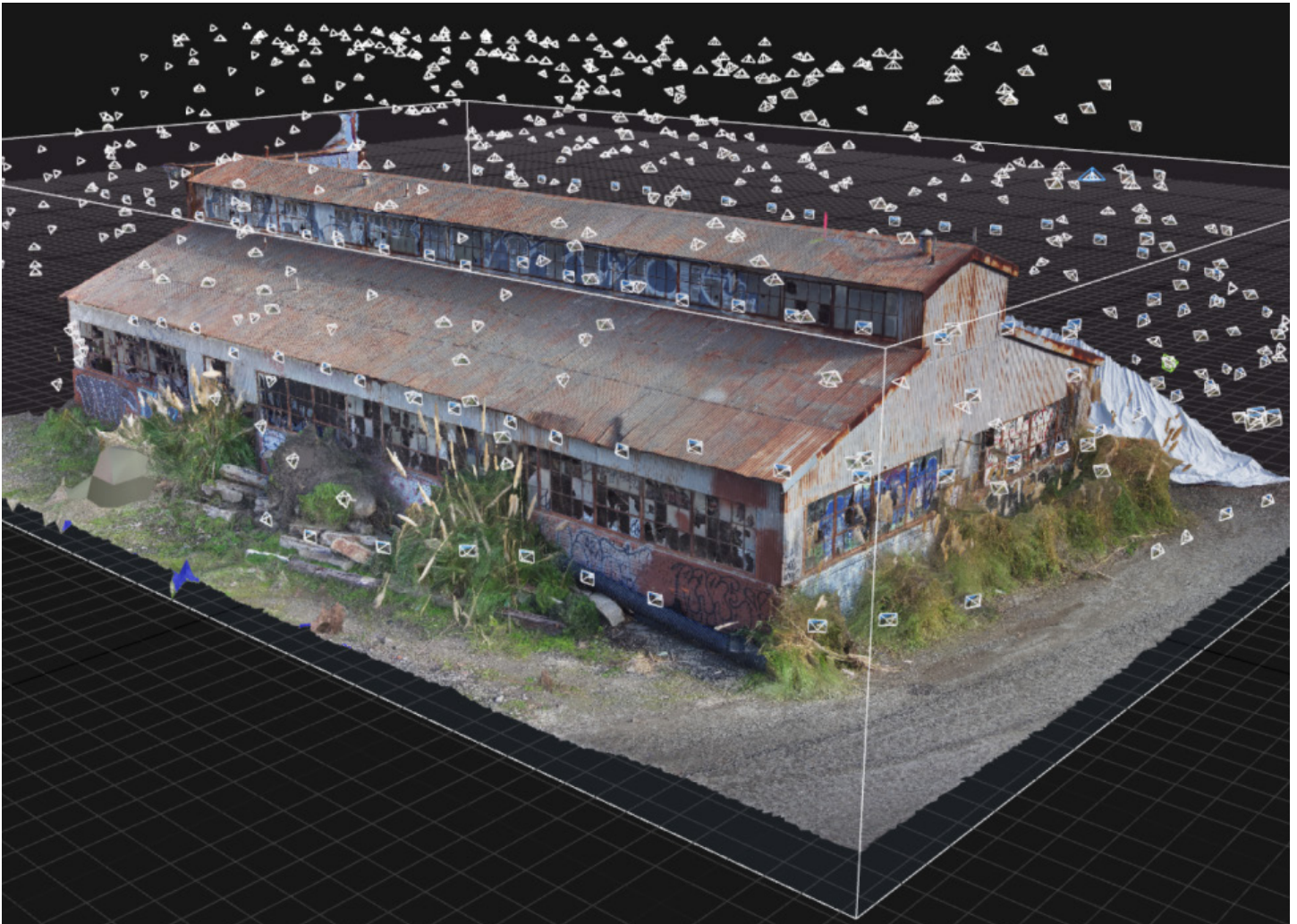


SKYDIO 3D Scan™

Software Manual



WARNING: Please read all documentation provided with your Skydio drone, including but not limited to the Safety & Operating Guide found here: www.skydio.com/safety

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Version: 24.2

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Skydio 3D Scan™

Skydio 3D Scan™ is first-of-its-kind adaptive scanning software seamlessly incorporated into Skydio Autonomy™. 3D Scan automates data capture of any scene with comprehensive coverage and ultra-high resolution, allowing crews to spend less time training pilots and more time performing higher quality inspections.

Skydio adaptively maps the scene and uses intelligent flight planning to build a live 3D model. With an augmented reality (AR) and AI-driven workflow, the drone plans a path to autonomously capture all surfaces using your specified settings. To create high-definition reconstructions, upload the images to a third party photogrammetry provider.

Skydio 3D Scan operates with no reliance on prior maps, magnetometer readings or active internet connectivity. Choose your 3D Scan mode, specify the area or structure to scan, and Skydio 3D Scan does the rest.

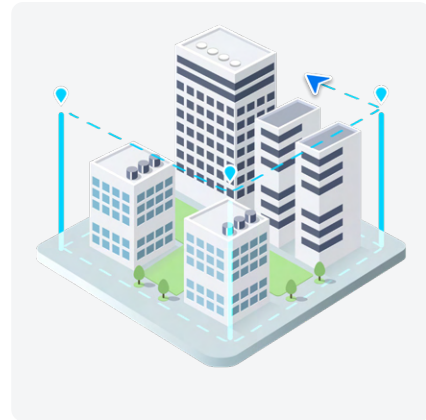
Skydio 3D Scan combines advanced autonomy and photogrammetry software to capture high-resolution photos of structures, bridges, and energy infrastructure. There are multiple different capture modes available with Skydio 3D Scan.

General Capture Modes

3D Capture

Efficiently scan complex structures with 3D Capture. Skydio assesses the scan volume and generates autonomous and adaptive flight patterns to ensure every angle of the structure is captured. Capture data can be used for inspection or to generate high-fidelity 3D models.

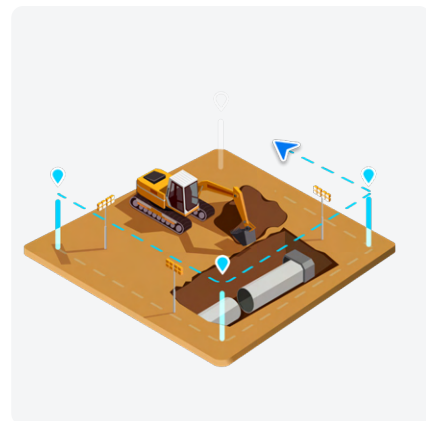
3D Capture is best for scanning structures such as machinery, bridges, architecture, and vehicles.



2D Capture

Rapidly cover large areas with 2D Capture scans. 2D Capture is a planar scanning capability that captures imagery for orthomosaics and digital terrain models. This mode supports traditional capture patterns, but has superior obstacle avoidance and uses the 3D Surface Engine to obtain accurate localization even in GPS-denied environments.

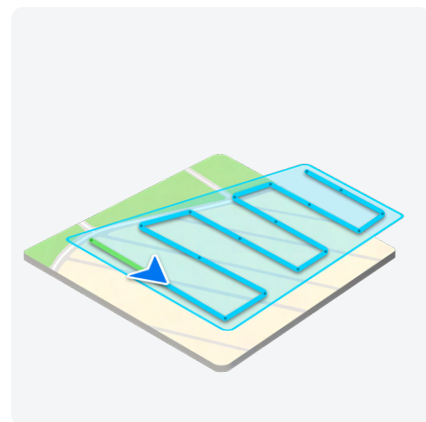
2D Capture is best for wide, flat area mapping. Use 2D Capture when you need a 2D orthomosaic map of areas such as accident sites or farmland. Recommended for scans of smaller, more precise areas.



Map Capture

Map Capture gives you the ability to preplan your flight using a top-down map view. Navigate to the scan location on the map and place area bounds to outline the area. Your drone will fly in a lawnmower pattern to capture the scene.

Use Map Capture when you need to scan large areas, such as rail yards or construction sites.

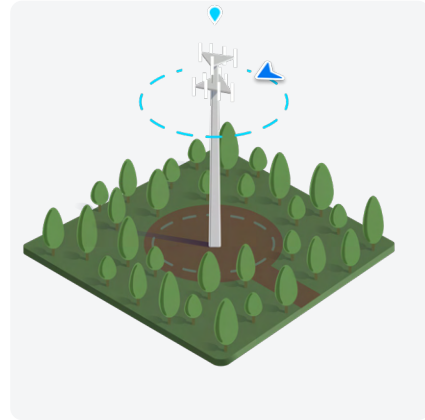


Specialized Capture Modes

3D Tower Capture

Tower Capture is optimized for capturing vertical structures. With a streamlined setup process and different default settings, this mode is designed to save battery life and make the scan setup more efficient.

Tower Capture allows you to define the scan volume as a cylinder. Use this mode when you want to scan structures such as telecommunication or transmission towers.



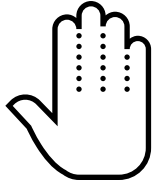
Indoor Capture

Indoor Capture allows you to scan interior spaces such as construction sites, factories, or warehouses. The autonomous flight path is tailored to indoor environments, and default settings are optimized for safely and accurately performing indoor mapping missions.

Indoor Capture allows you to work with two scan volumes: Inside Volume and Outside Volume. Use this mode to scan interior spaces such as construction sites, factories, or warehouses.



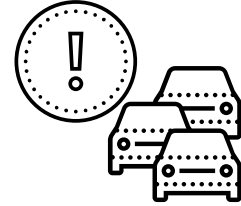
Safety Guidelines



Keep your fingers away from moving propellers at all times.



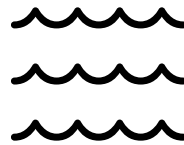
Use caution around reflective surfaces (still water, mirrors, etc.) and small obstacles (thin branches, utility lines, ropes, chain link fencing, etc.)



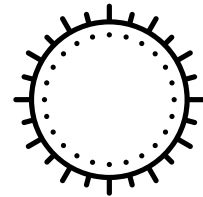
Skydio does not avoid moving objects or cars.



Skydio is not weatherproof – don't fly in rain, snow, fog, high winds, etc.



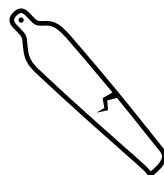
Before flying over water, ensure your drone has GPS lock. Launch and land your drone over a dry surface.



Don't fly in low-light conditions or in poor visibility.



Clean all of the cameras so Skydio can see clearly.



Check your propellers for damage before flying.



Follow all civil aviation authority regulations, as well as any applicable local and federal laws.

FLYING SAFELY

Pre-Flight

- Ensure that all of the camera lenses are dust and smudge-free prior to flight.
- Inspect the battery magnets and connections for damage and debris prior to flight.
- Inspect propeller blades for nicks, cracks, or other visible damage prior to flight.
- Inspect the chassis for damage and debris prior to flight.
- Remove the gimbal retaining clip from the front-facing camera.
- Ensure any Battery Saver or Low Power modes are disabled on your mobile device. These modes may interfere with Skydio's ability to communicate with the device and negatively impact your flight experience.
- When flying Skydio X2, ensure all 4 arms are fully deployed against the hard stops. Ensure arm clamps are fully seated prior to initiating flight. Failure to do so may result in unstable flight and/or a loss of control. A moderate amount of force is required to fully seat the clamp to the arm - if the arm clamp closes with low effort, damage has occurred within the hinge and the drone should not be flown.

Environment

- Do not fly in precipitation, fog, or snow.
- Ensure flight environment has good visibility. Skydio 2/2+ can only fly in normal daytime conditions.
- Do not fly Skydio 2/2+ in extremely hot temperatures above 104°F (40°C).
- Do not fly Skydio 2/2+ in extremely cold temperatures below 23°F (-5°C).
- Do not fly Skydio X2 in extremely hot temperatures above 109°F (43°C).
- Do not fly Skydio X2 in extremely cold temperatures below 14°F (-10°C).
- When flying in temperatures below 32°F (0°C) ensure your batteries are pre-warmed to 50°F (10°C) prior to takeoff.
- When flying Skydio 2/2+ avoid windy weather conditions, or gusts above 25 mph (40 km/h). Your drone will automatically Return to Home when it estimates winds above 25 mph (40 km/h).
- When flying Skydio X2 avoid windy weather conditions, or gusts above 23 mph (37 km/h).
- Fly cautiously around reflective surfaces such as still water or mirrors.
- Before flying over water, ensure your drone has GPS lock. Launch and land your drone over a dry surface.
- Do not fly around objects less than 0.5 in (1.27 cm) in diameter such as thin branches, utility lines, ropes, netting.
- Do not fly around objects in motion such as cars, boats, balls, animals, or other drones.

FLYING SAFELY

Warnings

- Fly cautiously around people.
- Avoid transparent or reflective surfaces, windows, or mirrors greater than 23 in (58 cm) wide.
- Avoid moving obstacles, cars, and animals.
- The pilot in command (PIC) is responsible for managing altitude, range, and battery level and monitoring in-app messages and alerts.
- Avoid flight in low-light conditions.
- Avoid flight in low-light conditions.
- Alert messages will display if Skydio determines the environment is not safe for flight.
- When instructed to do so, immediately fly your Skydio to the safest area and land.
- Flying at high altitudes may significantly increase the time required to return and safely land.
- Propeller blades are sharp—handle with care.
- Skydio should not be used or handled by a person under the age of 18.

Regulations

- Follow all civil aviation, such as the FAA or your countries regulatory agency, rules and regulations.
- You are responsible for your Skydio at all times. When operating your Skydio drone check knowbeforeyoufly.org / B4UFLY / CASA-verified before flying.
- Do not fly in an environment where the use of the device is not authorized or restricted.
- **Keep your Skydio drone within visual line of sight at all times**, unless you have received express permission to fly beyond visual line of sight from a civil aviation authority such as the FAA.



Visit <https://skydio.com/safety> and <https://skydio.com/support> for more information and helpful tips, videos, and articles.

Getting Started

Before you fly, read the operator manual of your drone to learn about the Skydio Autonomy Enterprise features. For Skydio manuals, visit skydio.com/manuals.

Ensure both your drone and the controlling device are fully charged, and your controller is paired to your drone.



Always follow the [Skydio Safety and Operating Guide](#) when flying – avoid thin branches, thin wires, and large glass/reflective panes.

Required Software

- Skydio Enterprise app for Android or iOS (*not required when flying with the Skydio Enterprise Controller*)
- Skydio Autonomy Enterprise™ license
- Skydio 3D Scan™ software add-on

Skydio 2/2+ Equipment

To fly 3D Scan you will need:



- Skydio 2/2+
- Skydio 2/2+ Batteries
- *Optional, but strongly recommended* Skydio 2/2+ Controller (*included in Pro Kit*) or Enterprise Controller
- 2x UHS Class 3 microSD cards (*minimum 128 GB*)
- Android or iOS mobile device with 1 GB available storage (*not required with the Enterprise Controller*)



NOTE: We strongly recommend flying 3D Scan with the Skydio 2/2+ Controller or Skydio Enterprise Controller to provide more precise control and extend the connection range.

SD Cards

Skydio 2/2+ requires UHS Class 3 (U3) or faster microSD cards to complete 3D Scans. Skydio cannot scan without properly formatted microSD cards.

1. Media Card 
2. Logs Card 



NOTE: We test with and recommend using [SanDisk Extreme PLUS](#) (128GB and 256GB).

Installing SD Cards

If you purchased an Enterprise Pro Kit directly through a Skydio Sales Representative, both the Media Card and Logs Card come pre-installed.

If you obtained your drone online and later purchased 3D Scan™, you will need to purchase a second SD Card and install both cards yourself.

1. Remove the battery from the bottom of Skydio 2/2+.
2. Flip the drone over and locate the Media Card slot. To the right of this, you'll notice a black cover blocking access to the Logs Card. You will need to remove this. Carefully and slowly pull the bottom of the cover toward the camera. This will expose a plastic placeholder for the Logs Card. Gently push inward to dislodge the plastic insert.
3. Insert your SD cards.

Formatting SD Cards

To format your Media Card or your Logs Card, follow the steps below:

1. Open the Skydio Enterprise app and connect to your Skydio 2/2+.
2. Navigate to the **INFO** tab.
3. Select your drone from the **Devices** list, then select **Manage Data**.
4. Select Format Media Card or Format Logs Card, depending on which card needs to be cleared.



NOTE: You must format the Logs Card within the Skydio Enterprise app to fly 3D Scan. Formatting cards permanently deletes all flight data and/or media from your drone.

Skydio X2 Equipment

To fly 3D Scan you will need:

- Skydio X2
- Skydio X2 Batteries
- Skydio Enterprise Controller
- 2x 256GB SD cards (*pre-installed*)



NOTE: If you replace the microSD cards, the minimum required size is 128GB. We test with and strongly recommend using [SanDisk Extreme PLUS](#) (128GB and 256GB) microSD cards.

SD Cards

Your Skydio X2 comes with SD Cards preinstalled. Before flying, ensure your SD cards are properly formatted. For detailed instructions on how to format either the Media Card or the Logs Card, review the **Formatting SD Cards** section of the Skydio X2E Operator Manual.

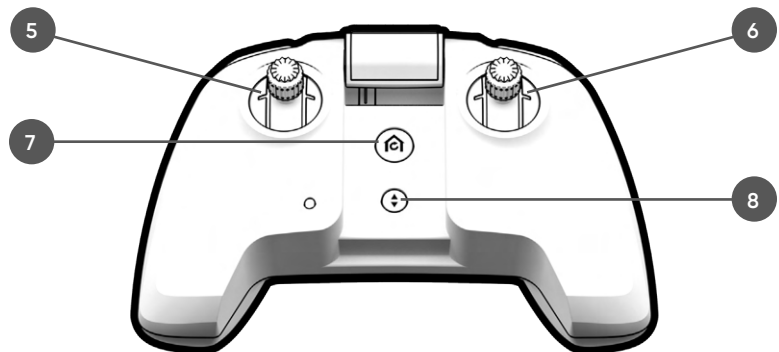
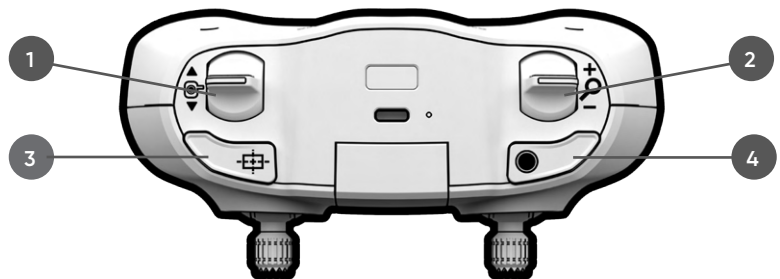
Controlling Devices

Move through the scan workflow using the Skydio Controller or Enterprise Controller. The app will display available controller shortcuts, and the workflow pane will collapse when you are prompted to manually fly.

Find controller support articles and manuals in the [Controlling Devices](#) section of our website.

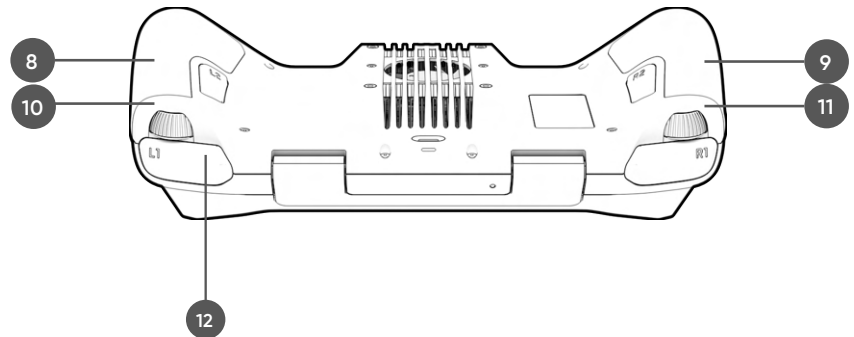
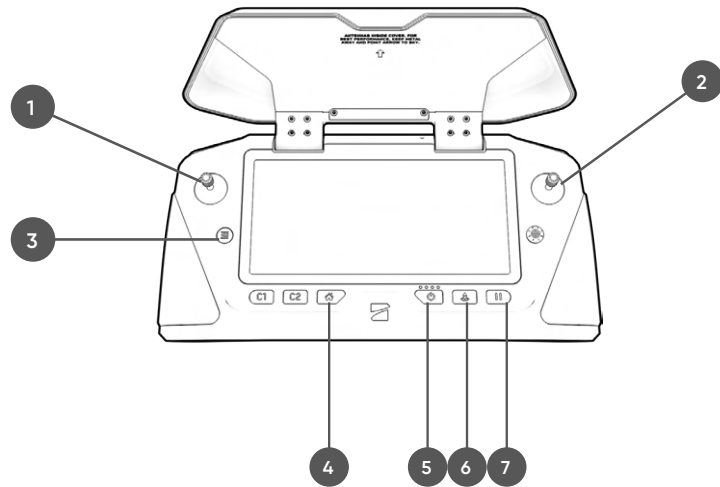
Skydio Controller

1. **Left Paddle:** Adjusts camera gimbal tilt
2. **Right Paddle:** Minimizes/maximizes the workflow pane
3. **Left Shoulder Button (L):** "DONE" and other controls
4. **Right Shoulder Button (R):** "BEGIN" and other controls
5. **Left Joystick:** Controls vertical movement (throttle) and drone rotation (yaw)
6. **Right Joystick:** Controls horizontal movement
7. **Return to Home Button:** Skydio will fly in a straight path to return to the Launch Point
8. **Launch/Land Button:** Skydio will takeoff and land in its current position



Skydio Enterprise Controller

1. **Left Joystick:** Controls vertical movement (throttle) and drone rotation (yaw)
2. **Right Joystick:** Controls horizontal movement
3. **Menu / Back Button**
4. **Return to Home (RTH) Button**
5. **Power Button**
6. **Land / Launch Button**
7. **Pause Button**
8. **Right Shoulder Button (R):** "DONE" and other controls
9. **Left Shoulder Button (L):** "BEGIN" and other controls
10. **Right Wheel:** Minimize/maximize the workflow pane
11. **Left Wheel:** Adjusts camera gimbal tilt
12. **R2 Button:** Opens the map view



How to Enable 3D Scan Mode

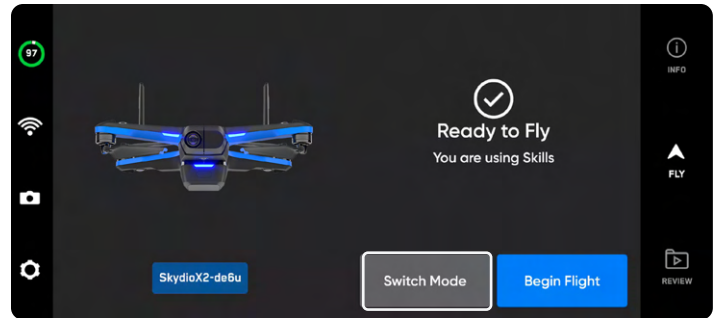
Change Vehicle Mode

Before starting a scan, the drone must **first reboot to enter the 3D Scan Mode**. Skydio will remember your operating mode through power cycles, so you will only have to do this when switching between 3D Scan and other Flight Skills.

STEP 1: Enter 3D Scan vehicle mode

Power on your drone and controlling device. To change operating modes, you must enter 3D Scan before launching while connected to the drone.

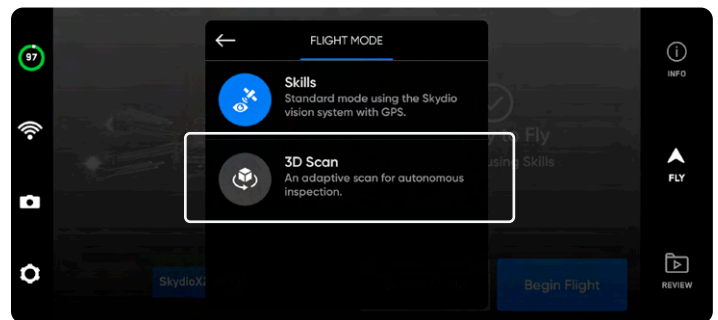
Select the gray button that says **Switch Mode**.



STEP 2: Select 3D Scan and reboot

Select **3D Scan** from the Flight Mode menu that appears. Skydio will automatically reboot. This should take about one minute.

After rebooting, Skydio will reconnect to your controller and mobile device.



STEP 3: Begin flight

After Skydio has finished entering 3D Scan, you are ready to fly! Ensure your Logs Card has been formatted before starting a scan. If you have not yet done so, a notification will display in the app. See the above **SD Card** section in **Getting Started** for instructions on how to format.

Press **Start Scan** and select **Agree** to the disclaimer, acknowledging that you will comply with all relevant laws and FAA regulations.



NOTE: You must **exit 3D Scan to regain access to Flight Skills**. To exit, first land the drone. Navigate back to the Fly Screen and select **Use Skills**. You also have the option to change Vehicle Modes in the Device Settings menu.

3D Capture Overview

Before you fly

- GPS will be required for scans higher than 65 ft (20 m)
- If needed, you can move backwards and re-do any steps in the workflow. Doing so will reset the steps you have already completed and discard any media that has been captured.
- **If you are flying with a Skydio X2 Color/Thermal** capturing thermal images is on by default. You have the ability to disable thermal image capture in the camera settings.

Refer to the table below for the default settings in this mode. For more detailed information about each setting, view the 3D Capture Settings section.

- Define the **Floor**, **Ceiling**, and **Wall Boundaries** to create your **Scan Volume**

SETTING	DEFAULT
Strict Geofence	All bounds OFF by default
Modify Scan Volume	Beyond Floor enabled
Gimbal angle	45°
Scan passes	Z, Y, X enabled
Overlap/Sidelap	80/70
Speed (applies when exploring and scanning)	11.2 mph (5 m/s)
Other settings ON by default	Take Best Photo

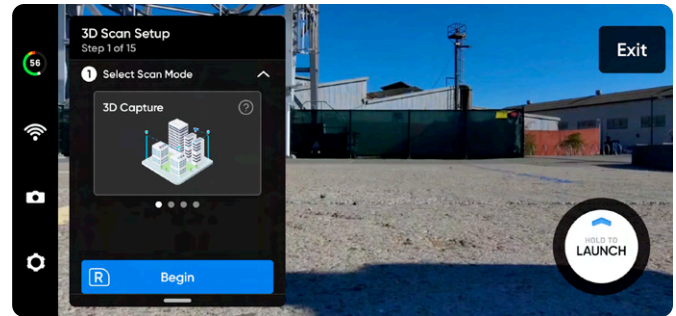


TIP: If you wish to capture the same structure with different GSD across various sections, or if you have a very large structure to scan, try breaking your scan into multiple smaller scans. For best results, launch as close as possible to the section of the structure you are scanning.

3D Capture Workflow

STEP 1: Select Scan Mode

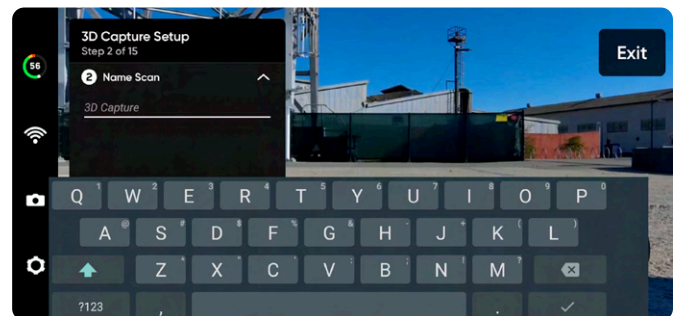
Select 3D Capture as the Scan Mode. Tap **Begin** on the screen or use the right shoulder button on the Controller.



STEP 2: Name Scan Site (optional)

The default scan name is composed of the scan mode you select followed by a UTC timestamp. Renaming the scan will replace the scan mode.

Ex: 3D_Capture__2021-05-20T19-50-55.135854+00-00



Scan names must use American Standard Code for Information Interchange (ASCII) characters. Spaces, Unicode characters such as à, é, â, ü, ö, ä and the following symbols will be converted to underscores (_) in the scan directory name: < > : ; \ | / ? * & \$ { } ` ' " Visit <https://skydio.com/support> for more information.

STEP 3: Launch

Select and hold the **LAUNCH** button to begin your flight. The drone will automatically climb to 6.5 ft (2 m) and hover.

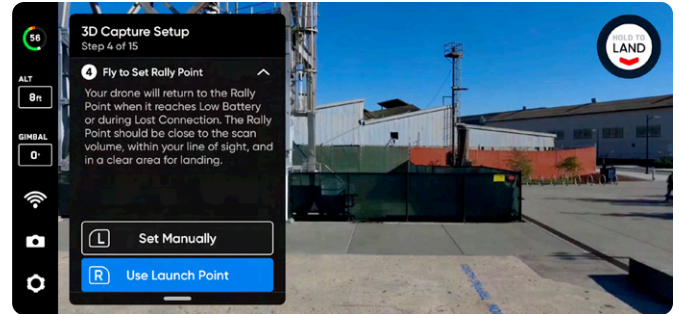


STEP 4: Set Rally Point

Once the scan completes, you will have the option to return to the Rally Point. Additionally, when the battery level is low or the drone loses connection, Skydio will return to the Rally Point.

To set your Rally Point, select one of the following options:

- **Use Launch Point** – drone will return to the take-off location instead of a manually set Rally Point.
- **Set Manually** – allows you to use Skydio Enterprise Controller to manually pilot the drone to a new location.



Tips for setting a Rally Point

- The Rally Point should be in your line of sight with a clear path to the Launch Point.
- Set your Rally Point close to the scan region so that the drone can safely and easily return to that point autonomously. Even if you change position during the scan, the drone will always have a point to return to safely without obstruction.
- Choose a location that is safe for landing.

STEP 5: Set Scan Floor

The Floor defines the bottom of the 3D volume you wish to scan. It will also define the bottom of your scan in the **Visual Geofence** and the **Edge Model Viewer**.

There are two ways to begin setting the Floor:

- **Use Default Height** starts the Floor at 1.6 ft (0.5 m) **above** the launch height. To ensure the ground is captured, Extend Capture Area > Below Floor is toggled on by default.
- **Set Manually** starts the Floor at the current height of the drone. Fly to place the Floor at your desired location.

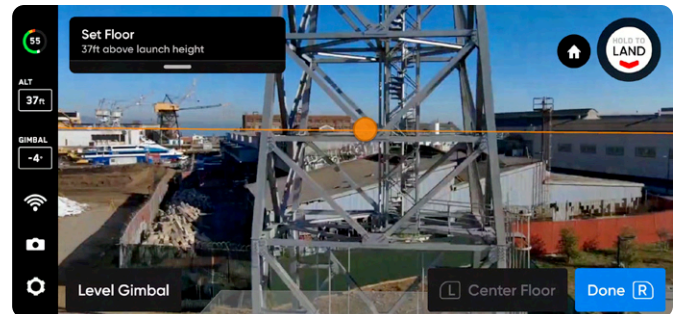
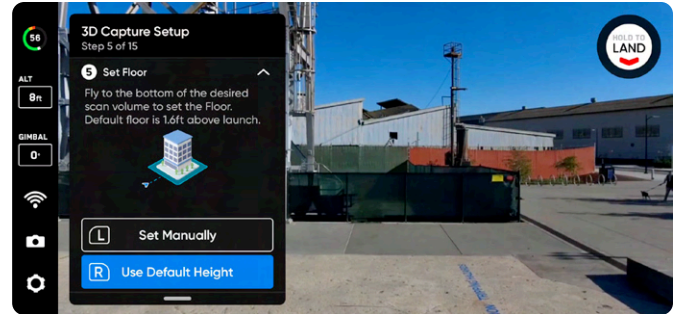
Once selected, adjust the Floor as desired:

- Pilot the drone and the Floor will automatically move with the drone as you fly
- Drag the orange Floor AR to the desired height

The **Launch Height** is represented by a **light gray AR plane**.

Use the Controller shortcuts to navigate the setup process:

- **Done** – Sets the Floor in your desired location and proceeds to the next step
- **Center Floor** – Moves the location of the Floor to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°



STEP 6: Set Scan Ceiling

The Ceiling defines the top of the 3D volume you wish to scan. It will also define the top of your scan in the **Visual Geofence** and the **Edge Model Viewer**.

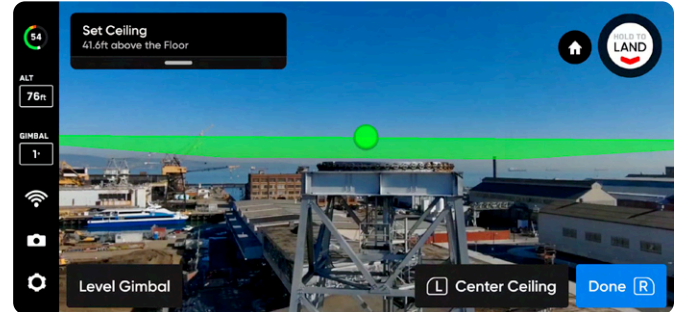
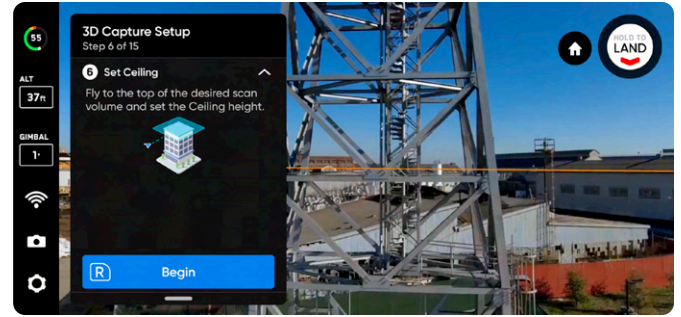
Press R to begin. The workflow pane will collapse to show a full-screen view of the green Ceiling AR. The Ceiling needs to be set above both the Floor and the structure you are scanning.

Adjust the Ceiling as desired:

- Pilot the drone and the Ceiling will automatically move with the drone as you fly
- Drag the green Ceiling AR to the desired height

Use the Controller shortcuts to navigate the setup process:

- **Done** – Proceeds to the next step
- **Center Ceiling** – Moves the location of the Ceiling to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°



STEP 7: Set Boundaries

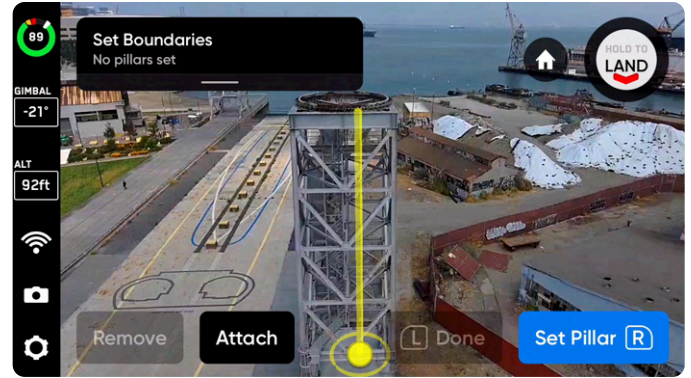
Set Augmented Reality (AR) pillars to encompass the structure to be scanned. These pillars define the lateral bounds for the **Visual Geofence** and the lateral area of your model in the **Edge Model Viewer**.

A minimum of three pillars must be set to create a 3D volume.

There are two options when setting pillars:

Fly to the desired location and use the right shoulder button to select **Set Pillar**. Continue placing pillars to encompass the entire structure. By default, pillars are attached to the drone. The edges of the polygon defined by the pillars must not cross each other.

- **Set Pillar** – Adds a new bounding pillar
- **Remove** – Removes the previous bounding pillar
- **Done** – Completes this step and finalizes pillar placement



TIP: Try adjusting the angle of the gimbal for a better view of where you are placing pillars.

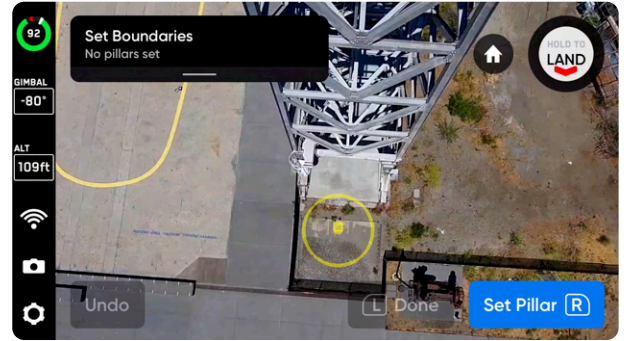
SCANNING WITH GENERAL CAPTURE MODES / 3D CAPTURE

Drag Pillars by holding the base of the yellow AR Pillar on-screen. This selects the active pillar and enables dragging. You may continue to set pillars by dragging or reconnecting the pillar to the drone by selecting "Attach."

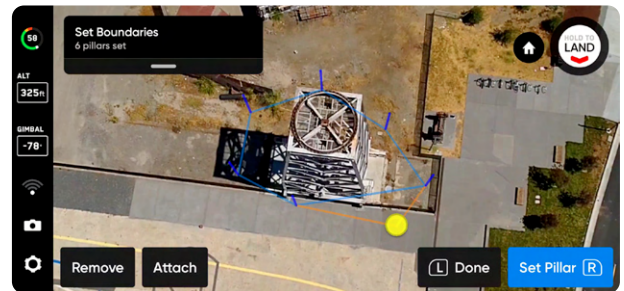
- **Set Pillar** – Adds a new bounding pillar
- **Done** – Completes this step and finalizes pillar placement
- **Attach** – Reconnects the pillar to the drone
- **Remove** – Deletes the previous bounding pillar



Only the current active pillar may be dragged.



Fly to place pillars



Drag to place pillars

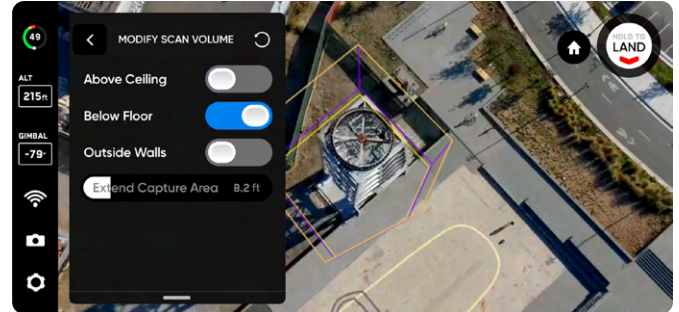
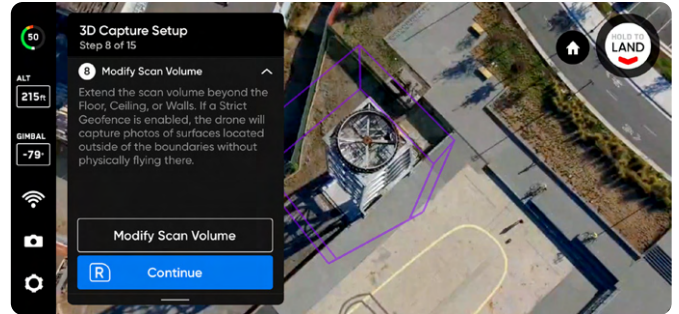
STEP 8: Modify Scan Volume

Modify Scan Volume expands the scan volume **beyond** the Floor, Ceiling or Walls.

Use the adjustable distance slider to set the distance at which Skydio will capture photos outside of the scan volume.

Below Floor is enabled by default to ensure the ground is captured.

If a **Strict Geofence** is enabled, the drone will face outward and capture photos of surfaces located outside of the scan boundaries **without physically flying there**.



EXAMPLE: If you set the distance slider to 8 feet (2 meters), enabling one of the boundaries allows you to capture photos 8 feet (2 meters) outside of the scan volume.



CAUTION: The Modify Scan Volume distance should not be larger than your Distance to Surface (DtS). If this happens and a strict geofence is enabled, no photos will be captured of objects that are located in the capture area beyond the DtS.

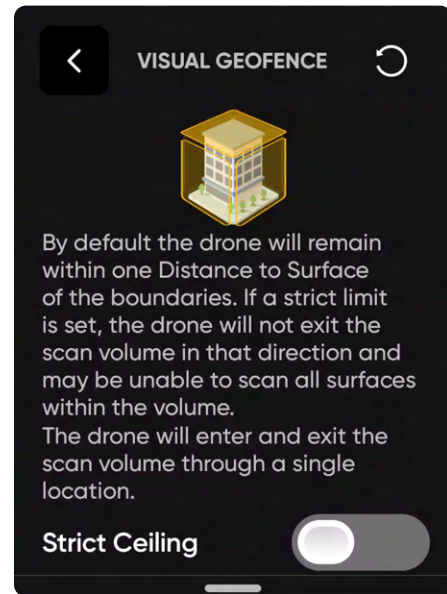
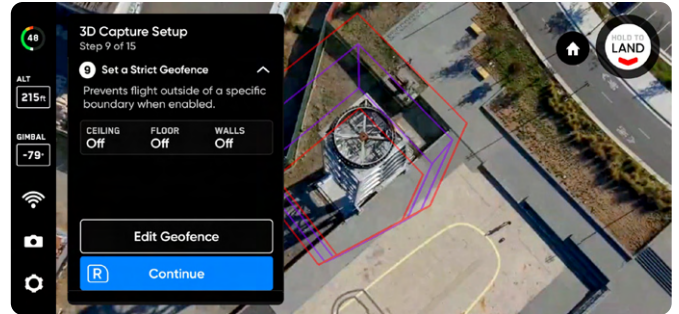
STEP 9: Set a Strict Geofence

Independently toggle the Ceiling, Floor, and Walls **ON** or **OFF** to set the geofence. By default, Skydio will remain within the scan distance of the boundaries.

Enabling a strict geofence (toggling ON) blocks flight outside of the scan volume along that bound. The drone will continue to enter and exit the scan volume through the same location.

Skydio will honor the Visual Geofence during the Explore phase and the scanning process, as well as when transitioning between the two. *For more details, read the Visual Geofence section under 3D Capture Settings below.*

You will also see a setting called **Safe Distance**, which allows you to set the distance from which Skydio will stay away from the structure while scanning. *Read more details about this setting in the 3D Capture Settings section below.*



NOTE: Skydio will skip image capture locations that are located outside any of the toggled geofence boundaries. This may result in gaps in coverage.

STEP 10: Set AR Observer

The Augmented Reality (AR) Observer allows you to set the point of view from which you can observe an augmented-reality view of the scan progress.

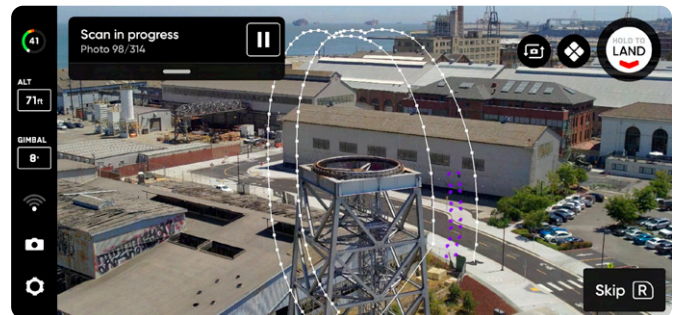
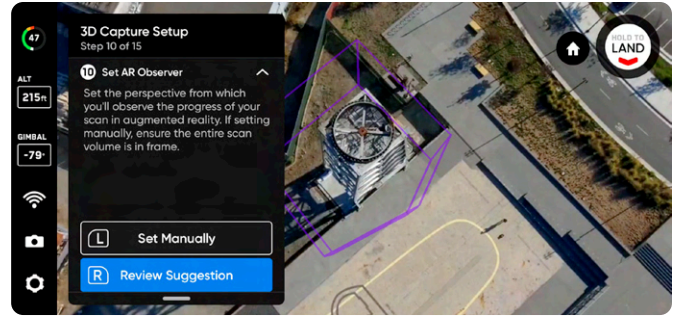
- When you set your AR Observer point, the drone will take a static image from that position
- The AR drone will follow the white lines, which denote the planned flight path and image capture locations
- The purple AR lines show the Wall Bounds



Toggle to switch between the static AR Observer image and the drone's camera feed at any time during the scan.

There are two ways to set the AR Observer:

- **Review Suggestion** means Skydio will fly to the ceiling of the pillar closest to the takeoff position. The drone will then face the structure (the centroid of the AR polygon-prism).
- **Set Manually** allows you to manually pilot the drone to your preferred vantage point, using the Skydio Controller. If you choose to manually set the location of the AR Observer, ensure you are choosing a spot that provides you with the best situational awareness for monitoring the scan's progress.



Tips for manually setting the AR Observer

- Tightly frame the structure
- Fill the frame vertically or horizontally
- Select this option if you are scanning complex environments or around obstacles


STEP 11: Explore

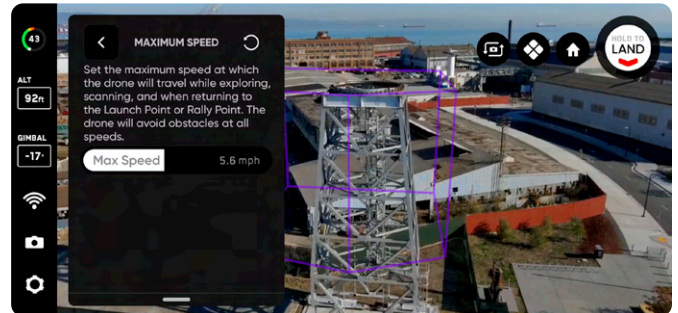
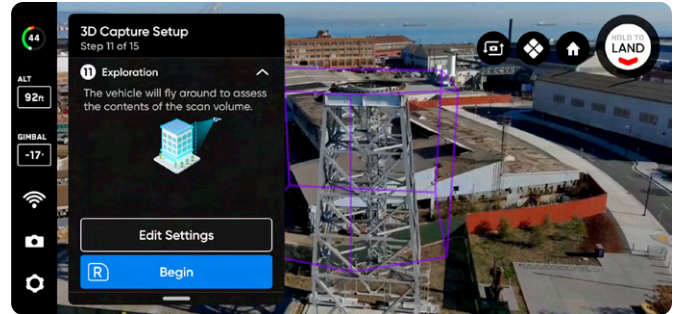
The drone will briskly and autonomously fly around the scan volume to build an internal model of the structure being scanned.

Skydio uses this internal model to intelligently predict overall scan time and number of capture points needed to complete the scan. The explore phase should be a small fraction of the total scan time, and a rough time estimate is given.

Select **Edit Settings** to adjust the speed at which your drone completes the Explore Phase.

- Minimum speed: **1.1 mph (0.5 m/s)**
- Maximum speed: **11.2 mph (5 m/s)**
- Default speed: **11.2 mph (5 m/s)**

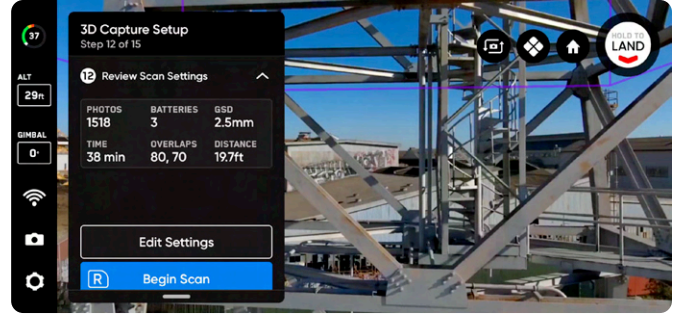
 Tap to toggle the AR Coverage Mesh.



STEP 12: Review or Edit Settings

View a summary of your scan settings, plus estimates for the total scan time, required number of batteries, and total number of photos. You must have at least five photos to begin a scan.

Editing scan settings will impact the total flight time, number of photos and the required number of batteries. See *3D Capture Settings* for more guidance.



Scan settings include:

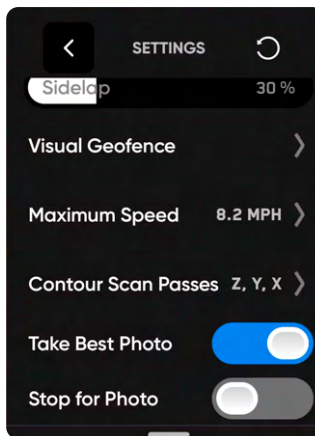
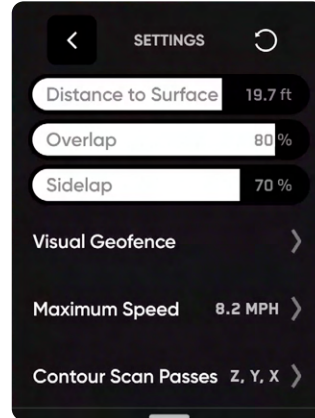
- Distance to Surface
- Overlap and Sidelap
- Visual Geofence
- Maximum Speed
- Contour Scan Passes (Z, Y, X)
- Take Best Photo
- Stop for Photo

Use the **Maximum Speed slider** to set the maximum speed at which Skydio will travel while exploring, scanning and when returning to the Launch Point or Rally Point.

- Minimum speed: **1.1 mph (0.5 m/s)**
- Maximum speed: **11.2 mph (5 m/s)**
- Default speed: **11.2 mph (5 m/s)**




Settings persist across scans of the same scan mode. Select the Reset button in the top right corner to restore settings to defaults.

Once your settings are finalized, you may select **Begin Scan** and Skydio will begin autonomously scanning the structure.



STEP 13: Scan

On the live camera feed you will see AR markers showing the scan capture points.

-  Optionally toggle on the AR Coverage Mesh during your scan to monitor the photo coverage progress of the scan. Learn more about this feature in the *AR Coverage Mesh* section.
-  Pause at any point during your scan. Use the left shoulder button or tap this icon in the workflow pane to pause scanning. Skydio will display how many photos have been captured. While paused, you have the option to manually capture photos using the right shoulder button.
-  Press the play icon or use the left shoulder button to resume autonomous scanning. Use the right shoulder button during a scan to Skip the next capture point.

Your scan may require multiple batteries. *For more information, see the Scanning with Multiple Batteries section.*

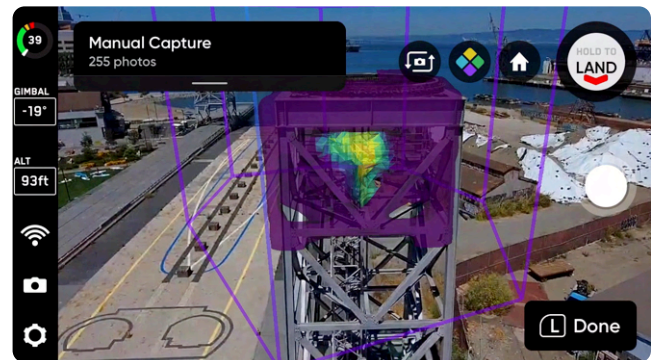
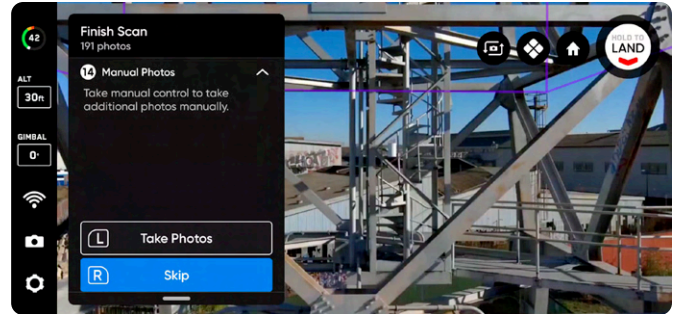


STEP 14: Manually Capture Photos *(optional)*

Once your scan completes, you will be given the option to manually capture more photos of the scene or details of specific areas of interest.

- The purple AR outline on-screen shows the Wall Bounds
- Use the right shoulder button to take a photo
- Manual photos will show up in the scan folder and in the Edge Model Viewer alongside the autonomously captured photos

Obstacle Avoidance set to Standard—and cannot be changed—when Skydio flies autonomously. If you are manually piloting the drone, you have the option to adjust your obstacle avoidance setting within the Device Settings menu.



NOTE: Manual photos may be captured at any time by pressing pause. You may also optionally enable interval mode to have the drone take photos at different time intervals (ex: capture a photo every 5 seconds).



CAUTION: Skydio obstacle detection does not detect moving objects and is disabled during landing. Review the Skydio Safety and Operating Guide for more information.

STEP 15: Scan Complete

Once the scan completes, you will have the option to either **start a new scan** or **Return to Launch** or **Return to Rally** if a manual rally point was set.

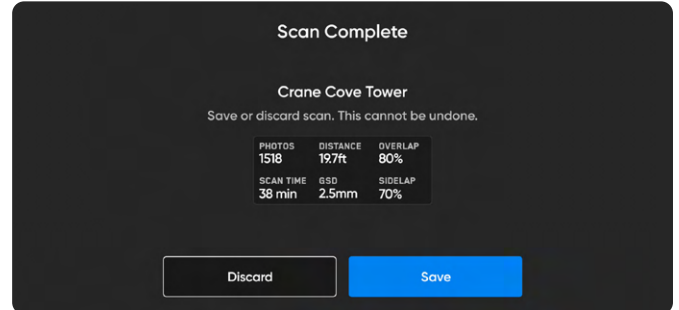
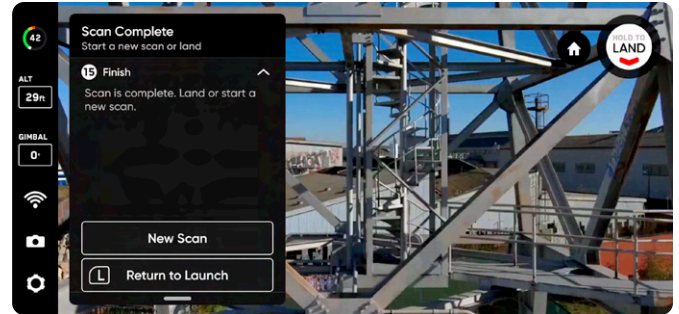
Starting a new scan will prompt you with an option to save or discard the scan you just completed.

- If you Return to Launch or Return to Rally and the path is clear, Skydio will obey the geofence and fly in a straight path to the chosen point
- If Skydio cannot find that path due to obstacles, you will be able to take control and manually pilot your drone

After landing, you will see a summary of the most recent scan and the option to save or discard the scan you completed.

Select **Save** and wait for the drone to process your scan. This is an important step to ensure your media is grouped by scan and can be viewed in the Edge Model Viewer.

Once processing is complete, select **Finish** to return to the Fly Screen or **Review Scan** to enter the Edge Model Viewer.



CAUTION: Do not remove the battery or power off during post-flight tasks. Doing so will result in loss of data. Do not power off or disconnect from the drone until you return to the Begin Flight screen.

2D Capture Overview

Before you fly

- GPS will be required for scans higher than 65 ft (20 m).
- If needed, you can move backwards and re-do any steps in the workflow. Doing so will reset the steps you have already completed and discard any media that has been captured.
- **If you are flying with a Skydio X2 Color/Thermal** capturing thermal images is on by default. You have the ability to disable thermal image capture in the camera settings.

Refer to the table below for the default settings in this mode. For detailed information about each setting, view the 2D and Map Capture Settings section.

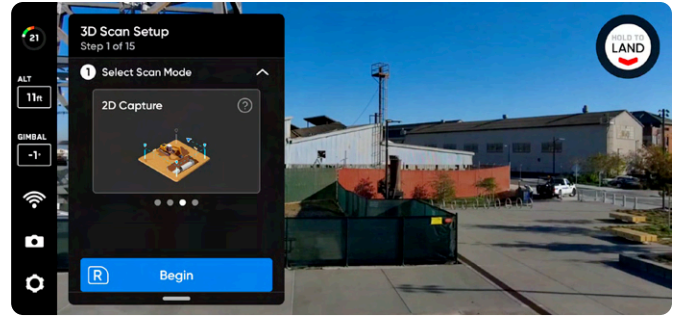
- Define the **Surface** and **Wall Boundaries** to create your **Scan Volume**

SETTING	DEFAULT
Strict Geofence	No Strict Geofence step in this mode
Modify Scan Volume	No Modify Scan Volume in this step
Gimbal angle	0° Crosshatch and/or Perimeter enabled: 60°
Overlap/Sidelap	70/70
Speed (applies when exploring and scanning)	5.6 mph (2.5 m/s)
Other settings that are ON by default	Take Best Photo

2D Capture Workflow

STEP 1: Select Scan Mode

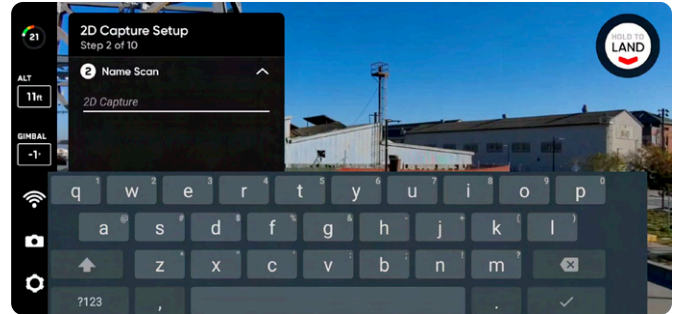
Select 2D Capture as the Scan Mode. Tap **Begin** on the screen or use the right shoulder button on the Controller.



STEP 2: Name Scan Site (optional)

The default scan name is composed of the scan mode you select followed by a UTC timestamp. Renaming the scan will replace the scan mode.

Ex: 2D_Capture__2021-05-20T19-50-55.135854+00-00



Scan names must use American Standard Code for Information Interchange (ASCII) characters. Spaces, Unicode characters such as à, é, â, ü, ö, ä and the following symbols will be converted to underscores (_) in the scan directory name: < > ; : \ | / ? * & \$ { } ` ' " Visit <https://skydio.com/support> for more information.

STEP 3: Launch

Select and hold the **LAUNCH** button to begin your flight. The drone will automatically climb to 6.5 ft (2 m) and hover.

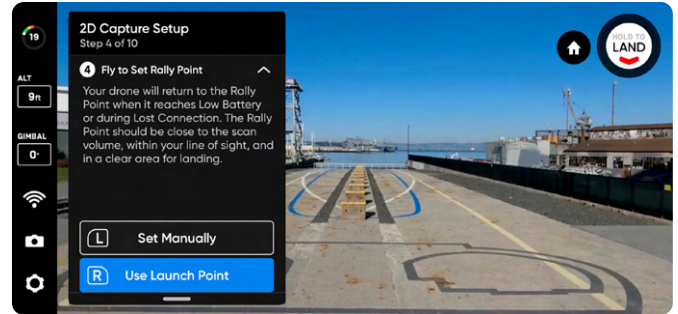


STEP 4: Set Rally Point

Upon completing the scan, you will see an option to have the drone return to the Rally Point. Additionally, when the battery level is low or the drone loses connection, Skydio will return to the Rally Point.

To set your Rally Point, select one of the following options:

- **Use Launch Point** – drone will return to the launch location instead of a manually set Rally Point.
- **Set Manually** – allows you to use Skydio Controller to manually pilot the drone to a new location.



Tips for setting a Rally Point

- The Rally Point should be in your line of sight with a clear path to the Launch Point.
- Set your Rally Point close to the scan region so that the drone can safely and easily return to that point autonomously. Even if you change position during the scan, the drone will always have a point to return to safely without obstruction.
- Choose a location that is safe for landing.

STEP 5: Set Scan Surface

The Surface defines the bottom of the area you wish to scan. It will also define the bottom of your reconstructed model in the **Edge Model Viewer**.

There are two ways to begin setting the Surface:

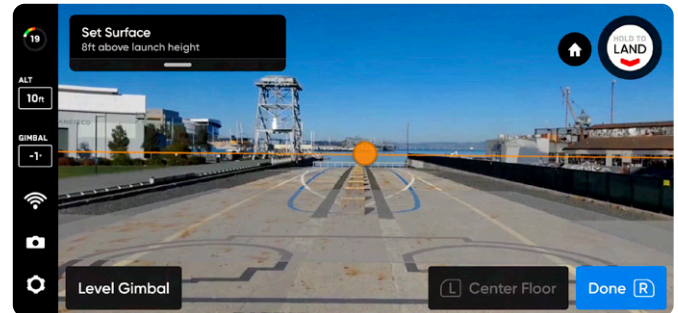
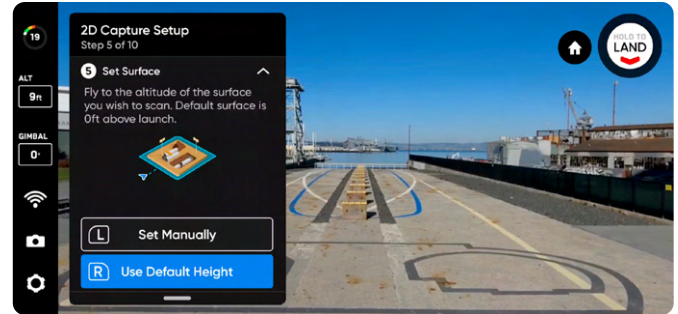
- **Use Default Height** starts the Surface at 0 ft (0 m) below the launch height.
- **Set Manually** starts the Surface at the current height of the drone.

Once selected, adjust the Surface as desired:

- **Pilot the drone** and the Surface will automatically move with the drone as you fly
- **Drag** the orange Surface AR to the desired height

The Launch Height is represented by a light gray AR plane.

- **Done** – Sets the Surface in your desired location and proceeds to the next step
- **Center Floor** – Moves the location of the Surface to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°



STEP 6: Set Boundaries

Set Augmented Reality (AR) pillars to encompass the area to be scanned. The pillars bound the area laterally. It will also define the lateral area of your reconstructed model in the **Edge Model Viewer**.

A minimum of three pillars must be set to create an area boundary.

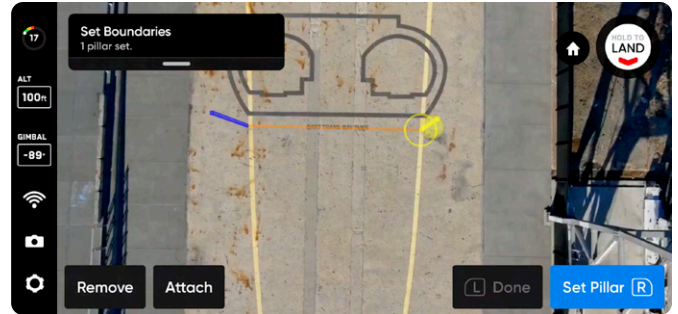
There are two options when setting pillars:

Fly to the desired location and use the right shoulder button to select **Set Pillar**. Continue placing pillars to encompass the entire structure. By default, pillars are attached to the drone. The edges of the polygon defined by the pillars must not cross each other.

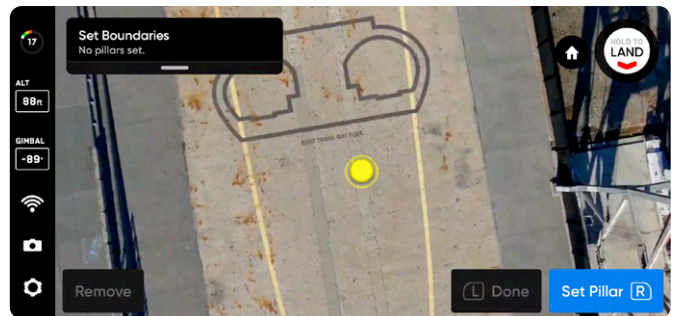
- **Set Pillar** – Adds a new bounding pillar
- **Remove** – Removes the previous bounding pillar
- **Done** – Completes this step and finalizes pillar placement

Drag Pillars by holding the base of the yellow AR Pillar on-screen. This selects the active pillar and enables dragging. You may continue to set pillars by dragging or reconnecting the pillar to the drone by selecting "Attach."

- **Set Pillar** – Adds a new bounding pillar
- **Done** – Completes this step and finalizes pillar placement
- **Attach** – Reconnects the pillar to the drone
- **Remove** – Deletes the previous bounding pillar



Drag to place pillars



Fly to place pillars



TIP: Try adjusting the angle of the gimbal for a better view of where you are placing pillars.




Only the current active pillar may be dragged.

STEP 7: Set AR Observer

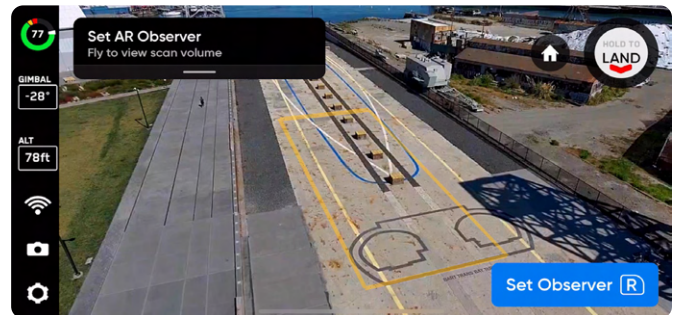
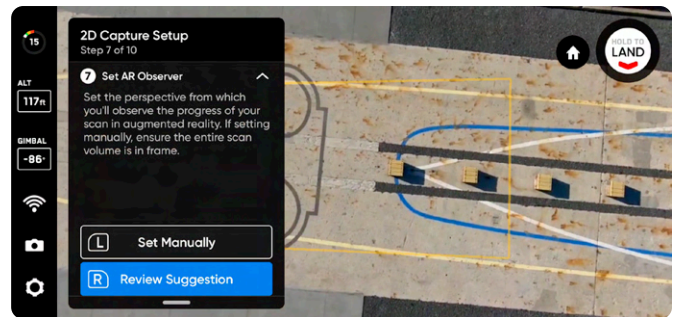
The Augmented Reality (AR) AR Observer allows you to set the point of view from which you can observe an augmented-reality view of the scan progress.

- When you set your AR Observer point, the drone will take a static image from that position
- The AR drone will follow the white lines, which denote the planned flight path and image capture locations
- The purple AR lines show the Wall Bounds

 Toggle to switch between the static AR Observer image and the drone's camera feed at any time during the scan.

There are two ways to set the AR Observer:

- **Review Suggestion** means Skydio will fly to the ceiling of the pillar closest to the takeoff position. The drone will then face the structure (the centroid of the AR polygon-prism).
- **Set Manually** allows you to manually pilot the drone to your preferred vantage point, using the Skydio Controller. If you choose to manually set the location of the AR Observer, ensure you are choosing a spot that provides you with the best situational awareness for monitoring the scan's progress.



Tips for manually setting the AR Observer

- Tightly frame the structure
- Fill the frame vertically or horizontally
- Select this option if you are scanning complex environments or around obstacles

STEP 8: Review or Edit Settings

View a summary of your scan settings, plus estimates for the total scan time, number of required batteries and total number of photos. Review your current settings and make any edits before the scan begins.

Editing scan settings will impact the total flight time, number of photos and the required number of batteries.

You must have at least five photos to begin a scan.

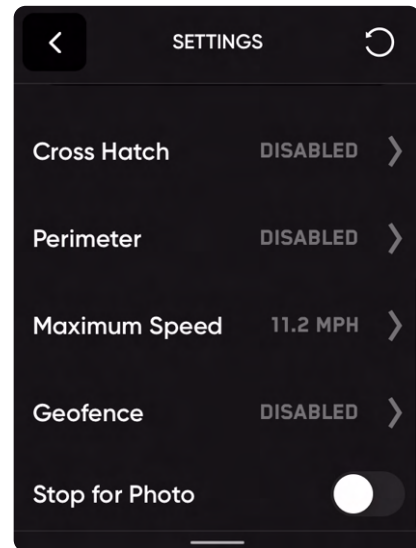
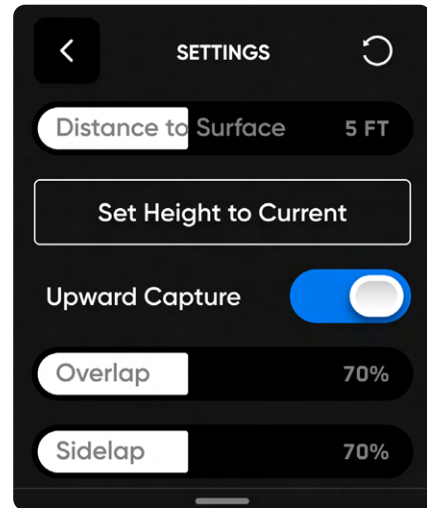
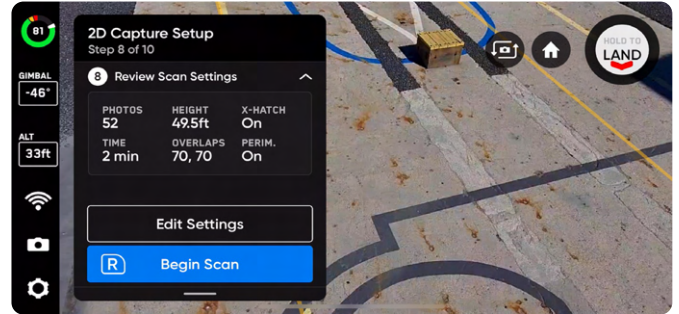
Scan settings persist across scans of the same scan mode.

If you plan to fly higher than the Height slider allows, simply fly to your desired altitude and select **Set Height to Current**.

To scan the underside of a structure, enable **Upward Capture** in the scan settings.

In a 2D Capture, the Height is relative to the Surface you set.

The **Geofence** option allows you to **enable Strict Boundaries** that Skydio will not exit while scanning.



CAUTION: With strict geofence enabled, the drone will stay within the scan area during data capture, but not necessarily during transit to and from the Launch Point.



CAUTION: Do not set your Height Ceiling below your desired scan altitude as this will impact GSD.

SCANNING WITH GENERAL CAPTURE MODES / 2D CAPTURE

Select **Edit Settings** and tap the Reset button in the top right corner to restore settings to defaults. This will not reset the Crosshatch or Perimeter. To restore the Crosshatch or Perimeter settings to default, tap either Crosshatch or Perimeter and select the Reset button in the top right corner of the screen.

The Crosshatch gimbal angle range is 55°–85° and the Perimeter gimbal angle range is 0°–90°.






The camera gimbal angle represents the angle below the horizon.

Use the **Maximum Speed slider** to set the maximum speed at which Skydio will travel while exploring, scanning and when returning to the Launch Point or Rally Point.

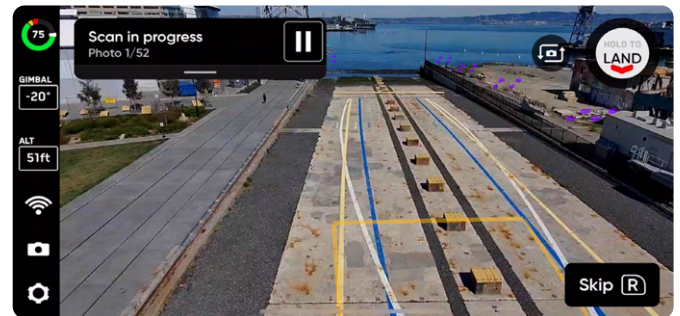
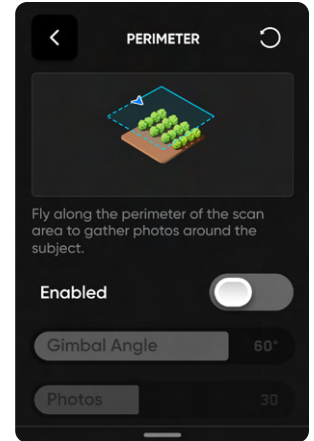
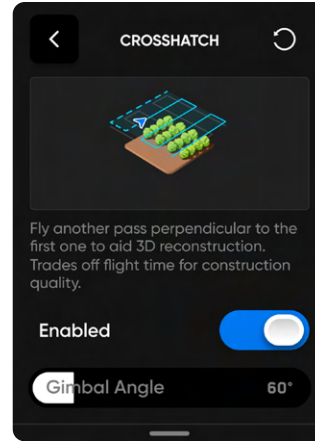
- Minimum speed: **1.1 mph (0.5 m/s)**
- Maximum speed: **11.2 mph (5 m/s)**
- Default speed: **5.6 mph (2.5 m/s)**

STEP 9: Scan

On the live camera feed you will see AR markers showing the scan capture points.

-  Optionally toggle on the AR Coverage Mesh during your scan to monitor the photo coverage progress of the scan. Learn more about this feature in the *AR Coverage Mesh* section.
-  Pause at any point during your scan. Use the left shoulder button or tap this icon in the workflow pane to pause scanning. Skydio will display how many photos have been captured. While paused, you have the option to manually capture photos using the right shoulder button.
-  Press the play icon or use the left shoulder button to resume autonomous scanning. Use the right shoulder button during a scan to Skip the next capture point.

Your scan may require multiple batteries. *For more information, see the Scanning with Multiple Batteries section.*



STEP 10: Scan Complete

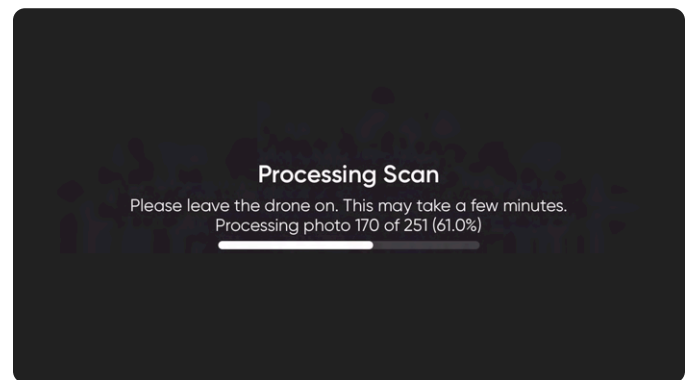
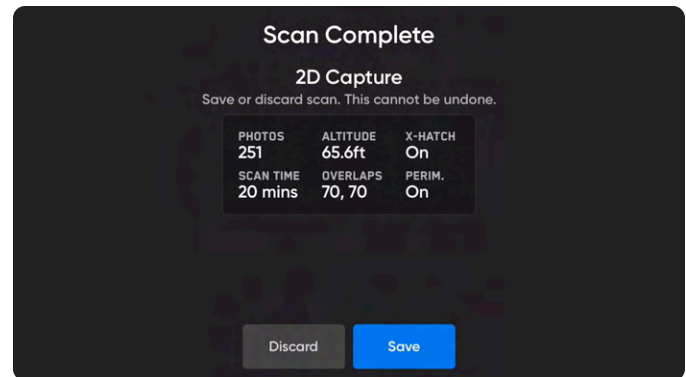
Upon completing the scan, Skydio will automatically fly laterally to the Launch Point at the scan Height.

- Skydio will first fly laterally until it is above or below the chosen point and then move vertically to reach it
- When it reaches the Launch Point, it will descend until it is 16 ft (5 m) above the Launch Point
- You will have the option to start a new scan, save the scan, or discard the scan you just completed.

After landing, you will see a summary of the most recent scan and the option to save or discard the scan you completed.

Select **Save** and wait for the drone to process your scan. This is an important step to ensure your media is grouped by scan and can be viewed in the Edge Model Viewer.

Once processing is complete select **Finish**.



CAUTION: With strict geofence enabled, the drone will stay within the scan area during data capture, but not necessarily during transit to and from the Launch Point.



CAUTION: Do not remove the battery or power off during any post-flight tasks. Doing so will result in loss of data. Do not power off or disconnect from the drone until you return to the **Begin Flight** screen.

2D Upward Capture

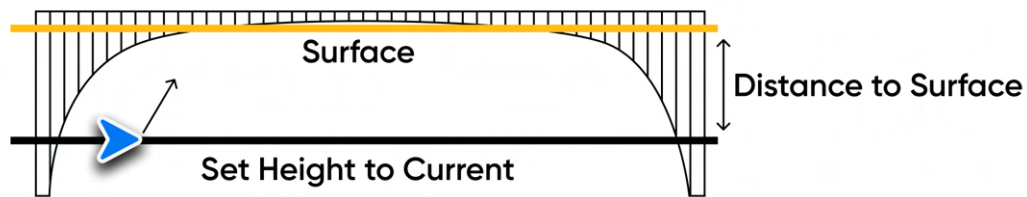
How to scan the underside of a structure: Bridge use case example

To capture the underside of a bridge, enable the toggle called **Upward Capture** located in the scan settings.

Skydio will **automatically move the camera gimbal pitch to look up** when it detects the height of the drone is below the specified scan Surface.

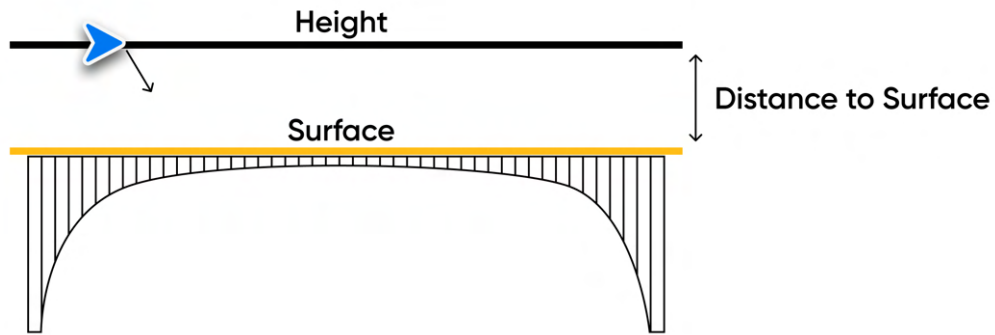
Best practices and recommendations

- Enable **Stop for Photo** when scanning the underside of a structure in low-lit environments
- When scanning narrow bridges, set your pillars underneath or at the edge of the bridge
 - Doing so will help the drone relocalize during multi-battery scans
- Keep in mind the height below the surface will be equal to the difference between the Surface height and scan height
- When scanning homogenous surfaces, such as solid steel or concrete structures, we recommend increasing your Distance to Surface (about 16 ft / 5 m)
 - Scanning too close to such structures may result in difficulties when creating a reconstruction
 - **For Skydio X2 Color/Thermal users, we highly recommend a Distance to Surface of about 32 ft (10 m)**



The example image above shows a proper setup to capture the underside of the bridge.

- After setting the scan Surface in this scenario, enable Upward Capture in the scan settings
- The gimbal angle will automatically look up to capture the underside of the bridge



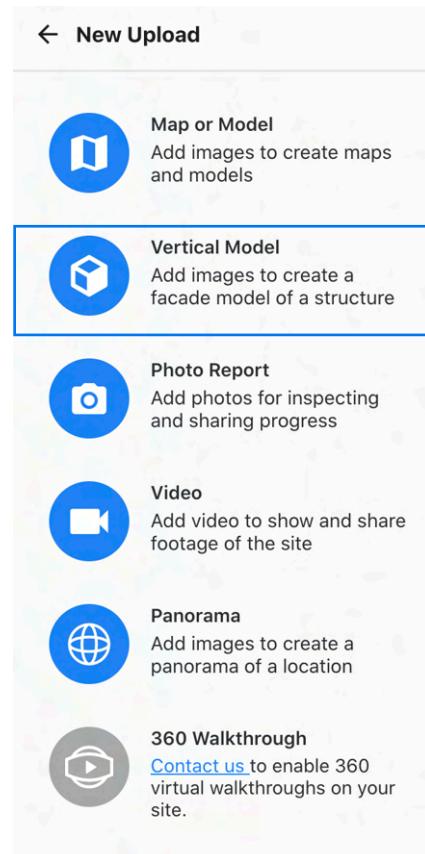
In the example image above, the user has set the Surface to cover the bridge deck, and the altitude of the drone is above the scan Surface.

- In this scenario, the Height can be set one of two ways: using the Height slider or by flying to the desired altitude and selecting Set Height to Current
- The gimbal angle will automatically look down to capture the bridge deck
- Using the Set Height to Current feature is not a requirement when capturing the top of a bridge

Recommendations for DroneDeploy reconstructions

To process a successful 3D model of a 2D Upward Capture, ensure you select **Vertical Model**

1. Create or open a project in DroneDeploy
2. Set the scan location on the map
3. Select the **Upload** tab located at the top of the screen
4. Select **New Upload**
5. Select **Vertical Model**
6. Upload your scan photos



Map Capture Overview

Before you fly

- GPS is required in this scan mode.
- If you will be scanning in locations that do not have an internet-enabled Wifi connection, **you must import the map beforehand**. Refer to the operator manual of your drone for more information.
- Previously downloaded maps will automatically load when you select Map Capture as your scan mode.
- If needed, you can move backwards and re-do any steps in the workflow. Doing so will reset the steps you have already completed and discard any media that has been captured.
- **If you are flying with a Skydio X2 Color/Thermal** capturing thermal images is on by default. You have the ability to disable thermal image capture in the camera settings.

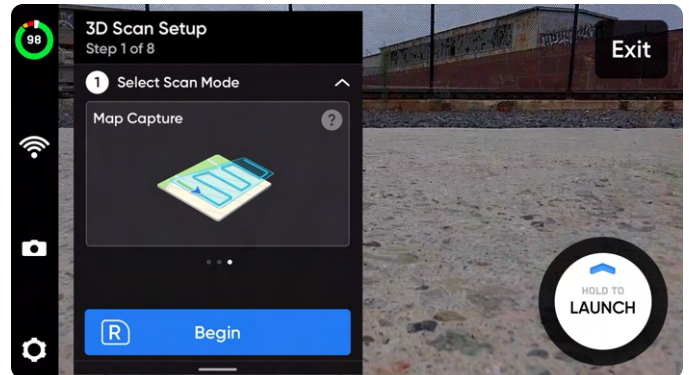
Refer to the table below for the default settings in this mode. For more detailed information about each setting, view the 2D and Map Capture Settings section.

SETTING	DEFAULT
Strict Geofence	No Strict Geofence step in this mode
Modify Scan Volume	No Modify Scan Volume in this step
Gimbal angle	0° Crosshatch and/or Perimeter enabled: 60°
Overlap/Sidelap	70/70
Speed (applies when exploring and scanning)	5.6 mph (2.5 m/s)
Other settings that are ON by default	Take Best Photo

Map Capture Workflow

STEP 1: Select Scan Mode

Select Map Capture as the Scan Mode. Tap **Begin** on the screen or use the right shoulder button on the Controller.

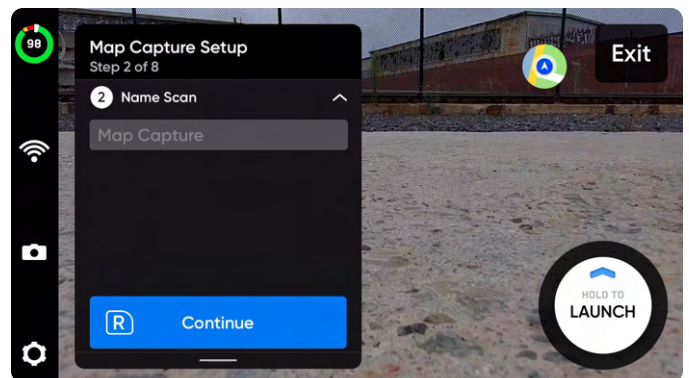


NOTE: You must download the map beforehand if you are flying in locations that do not have an internet-enabled Wifi connection.

STEP 2: Name Scan Site (optional)

The default scan name is composed of the scan mode you select followed by a UTC timestamp. Renaming the scan will replace the scan mode.


Ex: GPS_Capture__2021-05-20T19-50-55.135854+00-00



Scan names must use American Standard Code for Information Interchange (ASCII) characters. Spaces, Unicode characters such as à, é, ã, ü, ö, ä and the following symbols will be converted to underscores (_) in the scan directory name: < > ; \ / ? * & \$ { } ` ' " Visit <https://skydio.com/support> for more information.

STEP 3: Set Boundary Points




By default, a 328 ft x 328 ft (100m x 100m) polygon will automatically appear on your screen. Adjust the boundary points by dragging the green dots to surround the area you wish to scan. The flight path will be aligned with the longest edge of the polygon that you have created.

- Move the entire polygon around the map using the arrows 
- Add more boundary points by tapping the plus (+) on the white lines
- Press and hold a boundary point to remove it



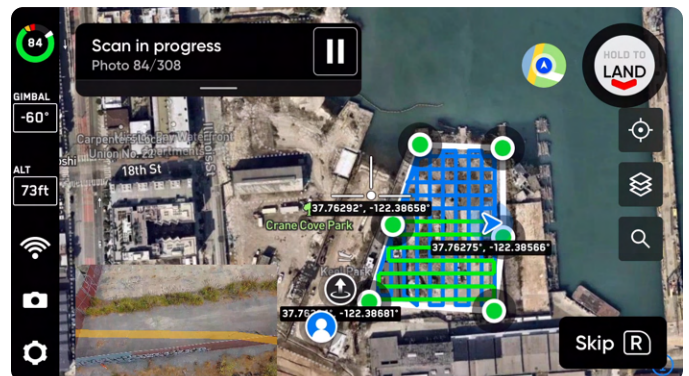
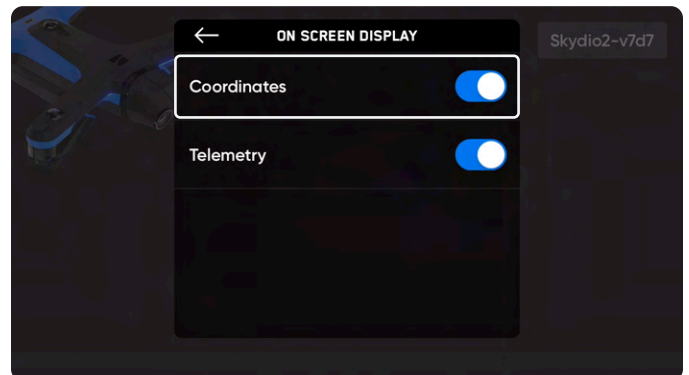
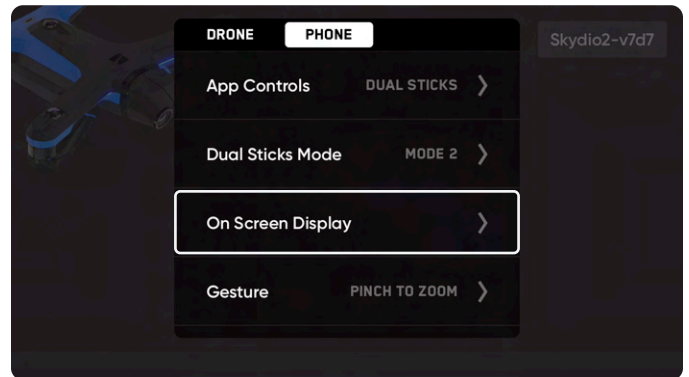
Previously downloaded maps will automatically load when you select Map Capture as your scan mode.

By default, GPS coordinates are visible on the map view. When enabled, coordinates are shown for the:

- Launch Point 
- Crosshair 
- Location of the drone 

To enable or disable GPS Coordinates on the map view:

1. Navigate to **Device Settings > Phone**
2. From the Phone menu, select **On Screen Display**
3. Tap to toggle Coordinates on or off



STEP 4: Review or Edit Scan Settings

View a summary of your scan settings, plus estimates for the total scan time and total number of photos. You must have at least five photos to begin a scan.

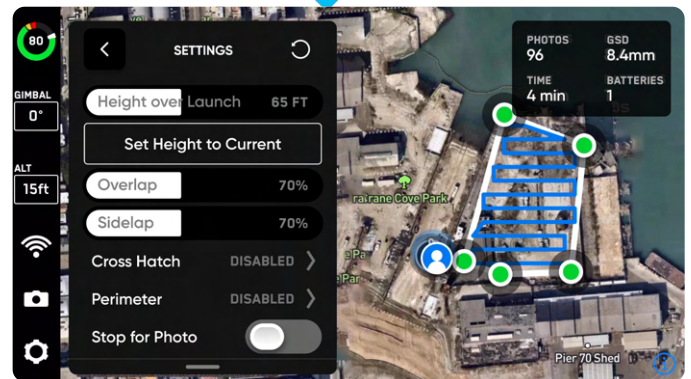
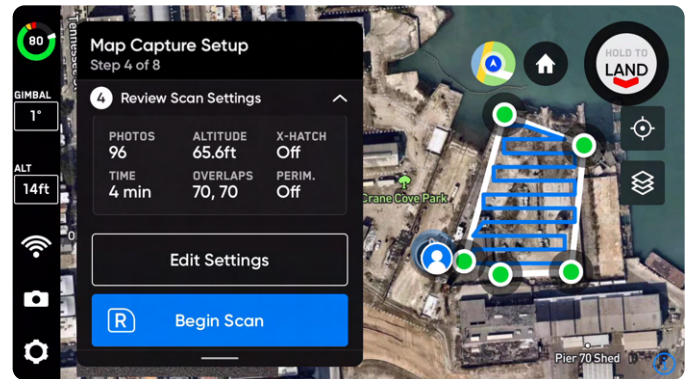
Scan settings persist across scans of the same scan mode.

The blue line shows the path the drone will take during the scan. This will refresh to show an updated version of the planned flight path when you adjust settings, such as enabling Crosshatch or Perimeter.

Use the **Maximum Speed slider** to set the maximum speed at which Skydio will travel while scanning and when returning to the Launch Point.

- Minimum speed: **1.1 mph (0.5 m/s)**
- Maximum speed: **11.2 mph (5 m/s)**
- Default speed: **5.6 mph (2.5 m/s)**

Select **Edit Settings** and tap the Reset button in the top right corner to restore settings to defaults. This will **not** reset the Crosshatch or Perimeter. To restore the Crosshatch or Perimeter settings to default, tap either Crosshatch or Perimeter and select the Reset button in the top right corner of the screen.



NOTE: We recommend enabling **Stop for Photo** when scanning at night.

SCANNING WITH GENERAL CAPTURE MODES / MAP CAPTURE

In a Map Capture, the **Height is relative to the launch point**. You have the option to either fly to your desired Height and select **Set Height to Current** or input a valid number between zero and your designated Height Ceiling into the text field.

Editing the scan settings will impact the total flight time, number of photos and the required number of batteries.

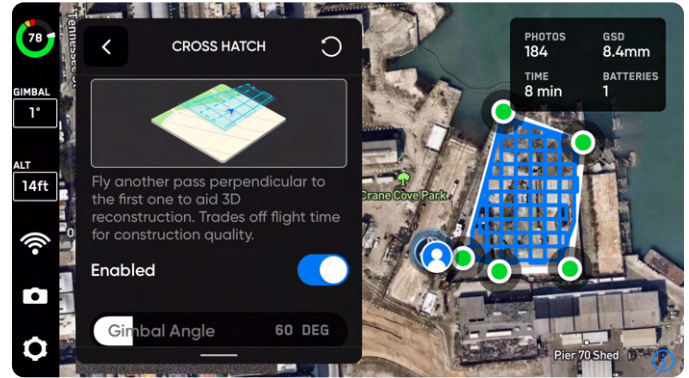
If you enable the **Perimeter** setting, you have the option to specify the number of photos taken.

- By default, Skydio will capture 36 photos when the Perimeter is enabled
- You may specify a minimum of 20 photos and a maximum of 80 photos.

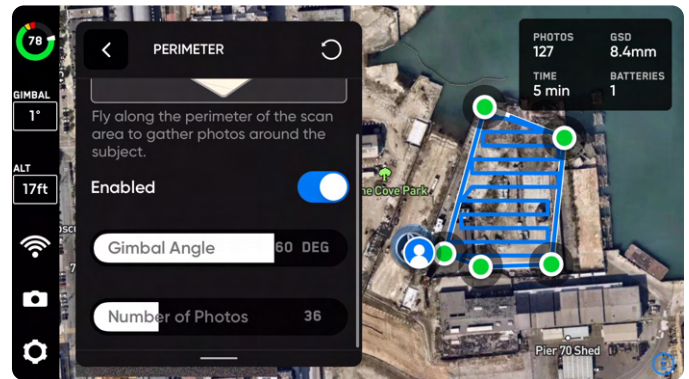
Tap the Reset button in the top right corner to restore the Crosshatch or Perimeter settings to defaults.



NOTE: The camera gimbal pitch represents the angle below the horizon.







Crosshatch enabled



Perimeter enabled

STEP 5: Launch and Begin Scan

The planned flight path will turn from blue to green as the scan progresses. On the live camera feed you will see AR markers showing the scan capture points.

-  Switch between the map view and the live camera feed by selecting the map icon in the top right of the screen.
-  Toggle on the AR Coverage Mesh during your scan to monitor the photo coverage progress of the scan. Learn more about this feature in the *AR Coverage Mesh* section.
-  Pause at any point during your scan. Use the left shoulder button or tap this icon in the workflow pane to pause scanning. Skydio will display how many photos have been captured. While paused, you have the option to manually capture photos using the right shoulder button.
-  Press the play icon or use the left shoulder button to resume autonomous scanning. Use the right shoulder button during a scan to Skip the next capture point.

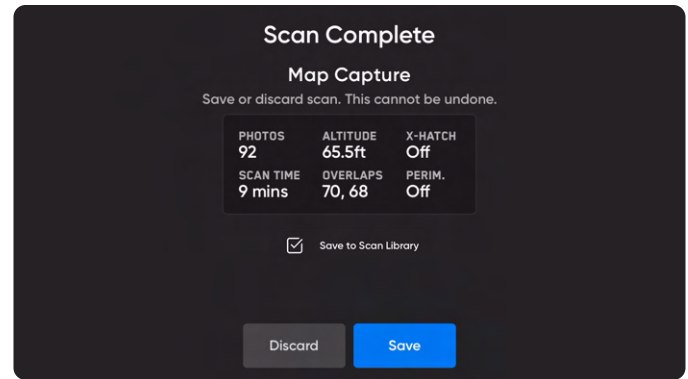


Your scan may require multiple batteries. For more information, see the *Scanning with Multiple Batteries* section.

STEP 6: Scan Complete

Upon completing the scan, Skydio will automatically fly laterally to the Launch Point at the scan Height. When it reaches the Launch Point, it will descend until it is 16 ft (5 m) above the Launch Point.

If you perform a **Map Night Capture**, Skydio will automatically fly laterally to the Launch Point at the scan Height. It will **not** descend when it reaches the Launch Point.



CAUTION: With Strict Geofences enabled, the drone will stay within the scan area during data capture, but not necessarily during transit to and from the Launch Point.

You will also have the option to start a new scan. Doing so will prompt you with an option to save or discard the scan you just completed.

After landing, you will see a summary of the most recent scan and the option to save or discard the scan you completed.

- Check **Save to Scan Library** to store this scan and the associated settings in your **Scan Library**
- See the next section, **How to save and repeat a Map Capture** for more information

Select **Save** and wait for the drone to process your scan. This is an important step to ensure your media is grouped by scan and can be viewed in the Edge Model Viewer.

Once processing is complete select **Finish**.

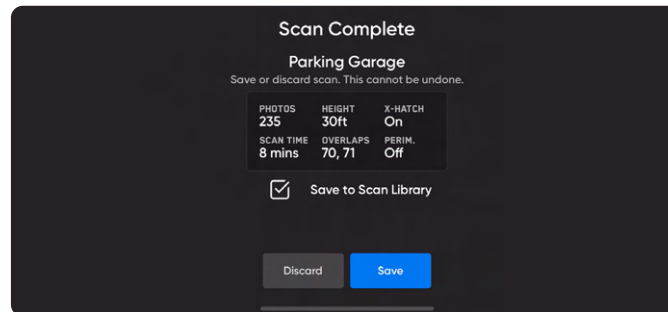


CAUTION: Do not remove the battery or power off during any post-flight tasks. Doing so will result in loss of data. Do not power off or disconnect from the drone until you return to the **Begin Flight** screen.

How to save and repeat a Map Capture

After you have completed your scan, you will see a checkbox that says **Save to Scan Library**. Select this option to save the specific scan settings and location to your Scan Library.

- Saved scans will automatically appear in the **Scan Library**
 - Access in the **INFO** tab under **Maps**
 - When your drone is connected and in 3D Scan mode, you can review and repeat the scan
- Exporting allows you to back up and save a scan as a **.mission file** on your mobile device, Skydio Enterprise Controller or external flash drive
- Importing .mission files is supported



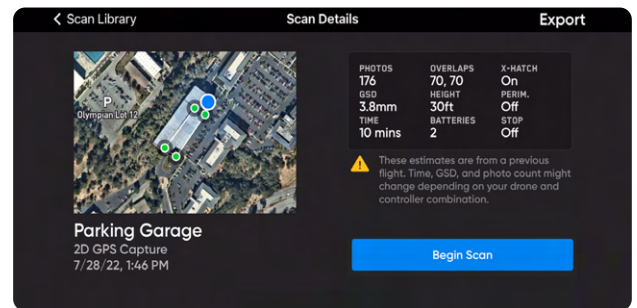
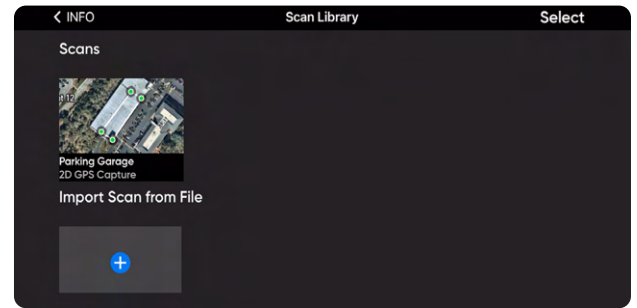
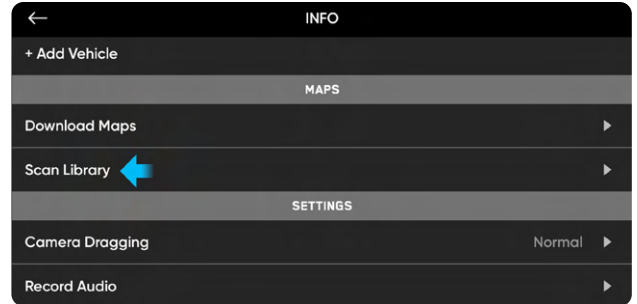
NOTE: If your goal is to scan an area in regular intervals and overlay the scans (e.g. tracking the progress of a construction site), we recommend using Ground Control Points (GCP). The use of GCPs helps match the drone location data to the terrestrially-measured location data.

Repeating a scan

1. Navigate to the **INFO** tab
2. Select **Scan Library** located under **Maps**
3. Select the scan you want to review or repeat
4. Select **Begin Scan**

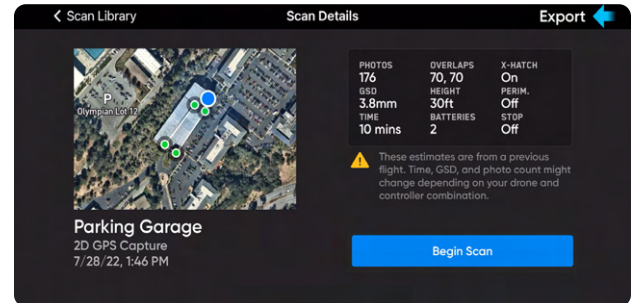
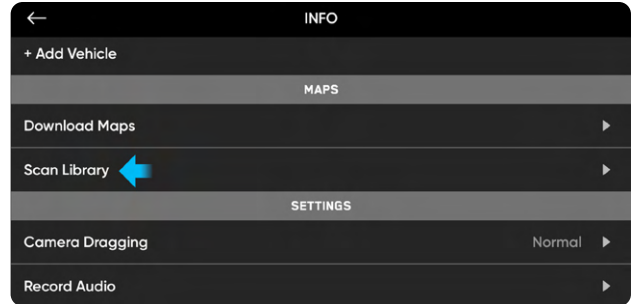
When loading a saved scan, Skydio will check that you are close to the scan boundary.

- Ensure you are connected to your drone and have rebooted into 3D Scan
- You must be within 450 m of the scan boundary
- GPS is required
- If you are too far from the original scan location you will be prompted to move closer



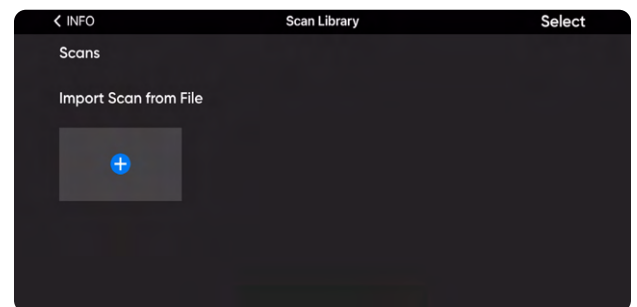
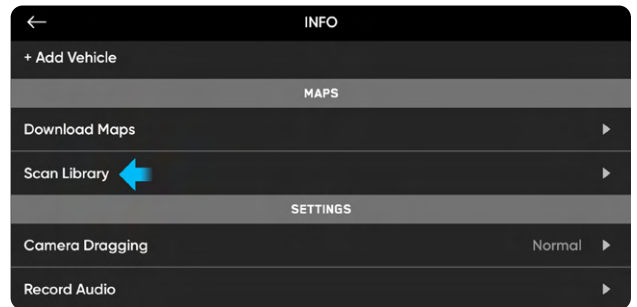
Exporting a saved scan


1. Navigate to the **INFO** tab
2. Select **Scan Library** located under **Maps**
3. Select the scan you want to export
4. Select **Export** in the top right corner
5. By default, your scan will be saved as a **.mission file** and can be exported locally to your mobile device or Skydio Enterprise Controller via flash drive

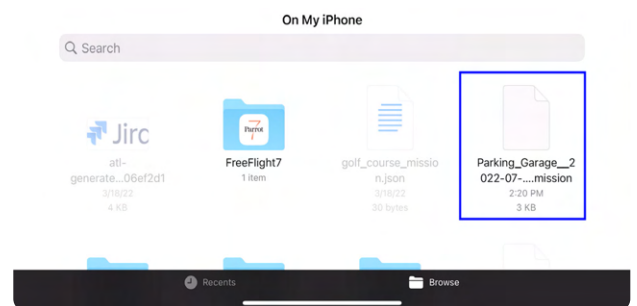


Importing a saved scan

1. Navigate to the **INFO** tab
2. Select **Scan Library** located under **Maps**
3. Select **Import Scan from File**
4. Locate the file on your flash drive or mobile device. Your scan will automatically appear in the Scan Library after importing is complete.



 **NOTE:** Only **.mission files** are supported when importing.



3D Tower Capture Overview

Before you fly

- GPS will be required for scans higher than 65 ft (20 m).
- **The camera gimbal angle automatically points downward**, ensuring your scan images only contain important textured surfaces.
- **Enable the X and/or Y scan passes** and Skydio will intelligently capture horizontal elements, such as the underside of antennas, without capturing excessive or redundant imagery.
- If needed, you can move backwards and re-do any steps in the workflow. Doing so will reset the steps you have already completed and discard any media that has been captured.
- **If you are flying with a Skydio X2 Color/Thermal** capturing thermal images is on by default. You have the ability to disable thermal image capture in the camera settings.

Refer to the table below for the default settings in this mode. For more detailed information about each setting, view the Scan Settings section.

- Set a singular **Center Pillar** at the center of the tower.
- Create a **Radius** instead of placing Wall Boundaries.
- Defaults the flight path to begin at the top or bottom of the tower, then Skydio flies a spiral path around the Z axis.

SCANNING WITH SPECIALIZED CAPTURE MODES / 3D TOWER CAPTURE

SETTING	DEFAULT
Strict Geofence	All bounds OFF by default
Modify Scan Volume	Beyond Floor enabled
Gimbal angle	-15°
Scan passes	Only Z is enabled
Overlap/Sidelap	80/70
Speed <i>(applies when exploring and scanning)</i>	11.2 mph (5 m/s)
Other settings ON by default	Take Best Photo

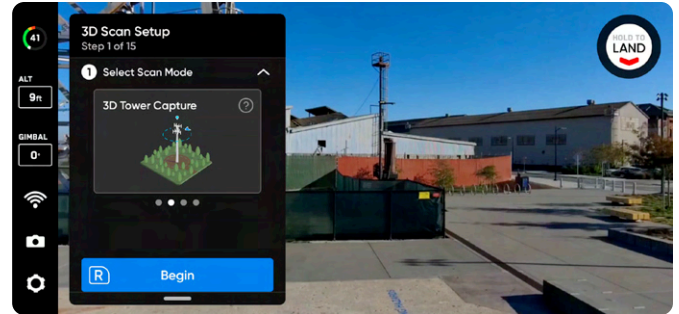


TIP: If you wish to capture the same structure with different GSD across various sections, or if you have a very large structure to scan, try breaking your scan into multiple smaller scans. For best results, launch as close as possible to the section of the structure you are scanning.

3D Tower Capture Workflow

STEP 1: Select Scan Mode

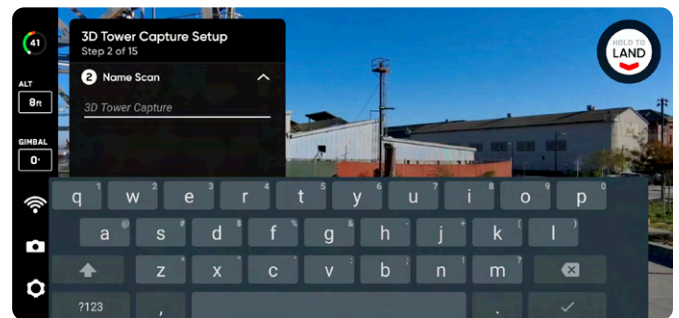
Select **3D Tower Capture** as the Scan Mode. Tap **Begin** on the screen or use the right shoulder button on the Controller.



STEP 2: Name Scan Site (optional)

The default scan name is composed of the scan mode you select followed by a UTC timestamp. Renaming the scan will replace the scan mode.

Ex: 3D_Tower_Capture__2021-05-20T19-50-55.135854+00-00



Scan names must use American Standard Code for Information Interchange (ASCII) characters. Spaces, Unicode characters such as à, é, â, ü, ö, ä and the following symbols will be converted to underscores (_) in the scan directory name: < > : ; \ | / ? * & \$ { } ` ' " Visit <https://skydio.com/support> for more information.

STEP 3: Launch

Select and hold the **LAUNCH** button to begin your flight. The drone will automatically climb to 6.5 ft (2 m) and hover.

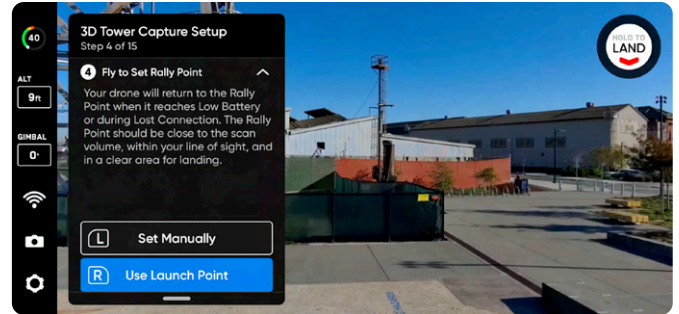


STEP 4: Set Rally Point

Once the scan completes, you will have the option to return to the Rally Point. Additionally, when the battery level is low or the drone loses connection, Skydio will return to the Rally Point.

To set your Rally Point, select one of the following options:

- **Use Launch Point** – drone will return to the launch location instead of a manually set Rally Point.
- **Set Manually** – allows you to use Skydio Controller to manually pilot the drone to a new location.



Tips for setting a Rally Point

- The Rally Point should be in your line of sight with a clear path to the Launch Point.
- Set your Rally Point close to the scan region so that the drone can safely and easily return to that point autonomously. Even if you change position during the scan, the drone will always have a point to return to safely without obstruction.
- Choose a location that is safe for landing.

STEP 5: Set Scan Floor

The Floor defines the bottom of the 3D volume you wish to scan. It will also define the bottom of your scan in the **Visual Geofence** and the **Edge Model Viewer**.

There are two ways to begin setting the Floor:

- **Use Default Height** starts the Floor at 1.6 ft (0.5 m) above the launch height. To ensure the ground is captured, Extend Capture Area > Below Floor is toggled on by default.
- **Set Manually** starts the Floor at the current height of the drone. Fly to place the Floor at your desired location.

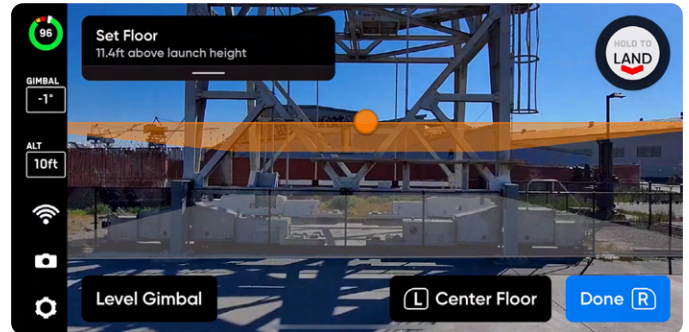
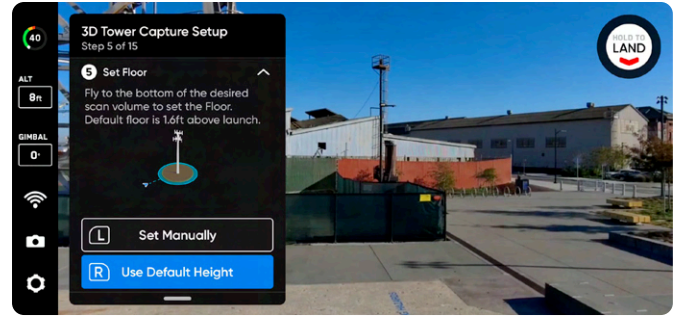
Once selected, adjust the Floor as desired:

- Pilot the drone and the Floor will automatically move with the drone as you fly
- Drag the orange Floor AR to the desired height

The Launch Height is represented by a light gray AR plane.

Use the Controller shortcuts to navigate the setup process:

- **Done** – Sets the Floor in your desired location and proceeds to the next step
- **Center Floor** – Moves the location of the Floor to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°



STEP 6: Set Scan Ceiling

The Ceiling defines the top of the 3D volume you wish to scan. It will also define the top of your scan in the **Visual Geofence** and the **Edge Model Viewer**.

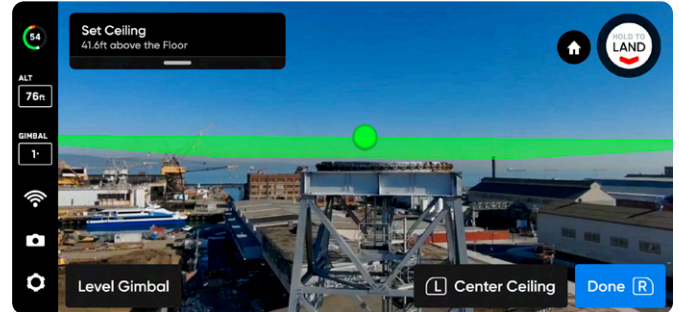
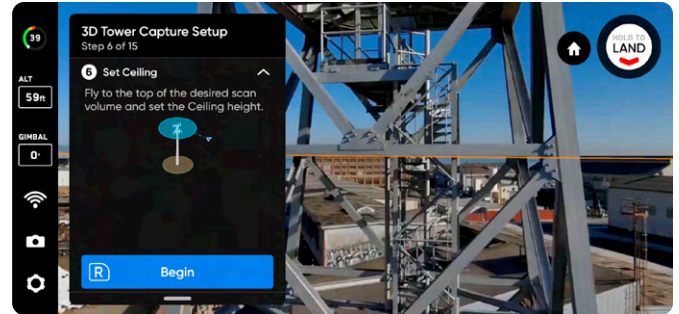
Press R to begin. The workflow pane will collapse to show a full-screen view of the green Ceiling AR. The Ceiling needs to be set above both the Floor and the structure you are scanning.

Adjust the Ceiling as desired:

- Pilot the drone and the Ceiling will automatically move with the drone as you fly
- Drag the green Ceiling AR to the desired height

Use the Controller shortcuts to navigate the setup process:

- **Done** – Proceeds to the next step
- **Center Ceiling** – Moves the location of the Ceiling to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°

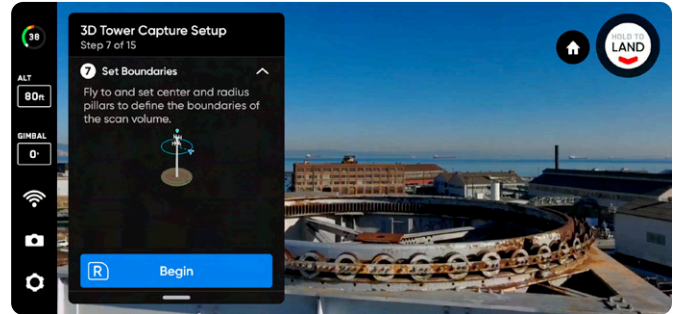


STEP 7: Set Boundaries (Center and Radius)

Press R to begin. The workflow pane will collapse to show a full-screen view of the yellow Augmented Reality (AR) pillar.

- The Center and Radius help define the center of the tower as well as the lateral bounds for the Visual Geofence.
- They also define the lateral area of your model in the Edge Model Viewer.

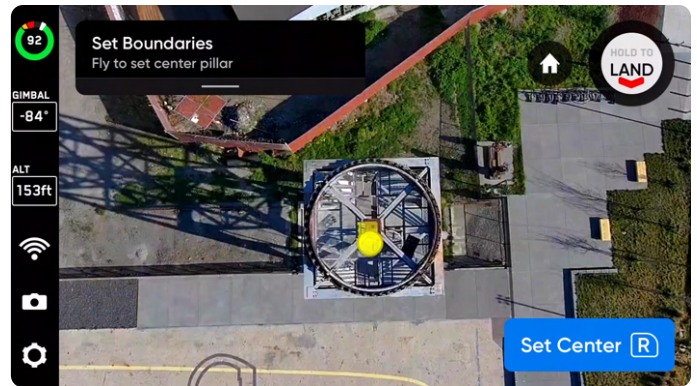
Fly to the approximate center of your tower and press R to place the Center Pillar. If you'd like to change the location of the Center, press L on your Controller.



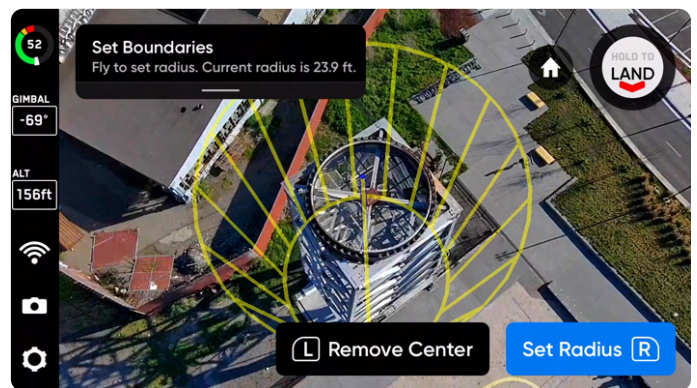
SCANNING WITH SPECIALIZED CAPTURE MODES / 3D TOWER CAPTURE

Set the Radius by flying to a location that creates an area large enough to encompass the widest part of the tower. Press R to place.

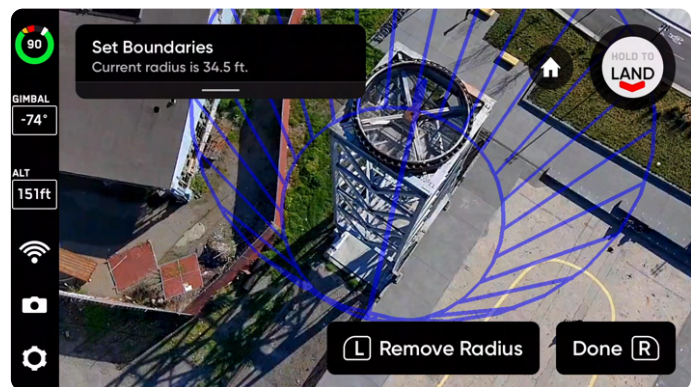
The on-screen AR imagery will turn blue to indicate the scan boundaries have been set and represents the scan volume you have just created.



Set Center



Set Radius



Boundaries set

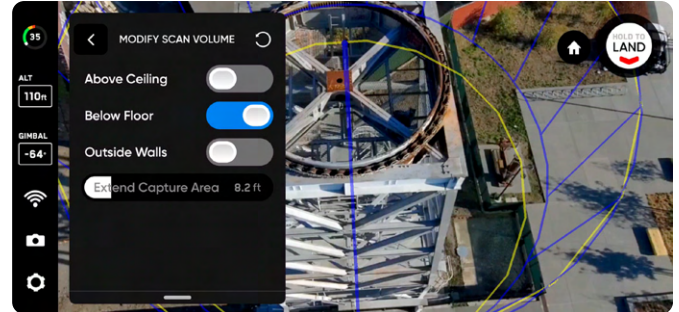
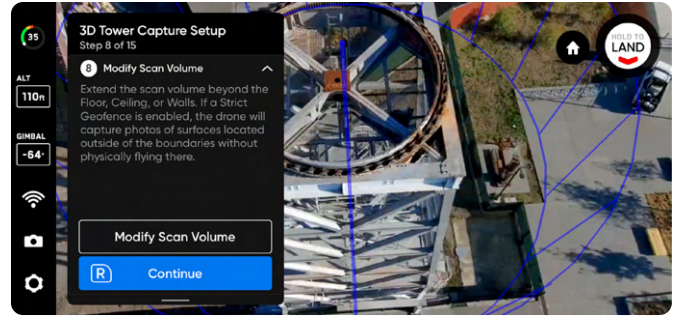
STEP 8: Modify Scan Volume

Modify Scan Volume expands the scan volume **beyond** the Floor, Ceiling or Walls.

Use the adjustable distance slider to set the distance at which Skydio will capture photos outside of the scan volume.

Below Floor is enabled by default to ensure the ground is captured.

If a **Strict Geofence** is enabled, the drone will face outward and capture photos of surfaces located outside of the scan boundaries **without physically flying there**.



EXAMPLE: If you set the distance slider to 8 feet (2 meters), enabling one of the boundaries allows you to capture photos 8 feet (2 meters) outside of the scan volume.



CAUTION: The Modify Scan Volume distance should not be larger than your Distance to Surface (DtS). If this happens and a strict geofence is enabled, no photos will be captured of objects that are located in the capture area beyond the DtS.

STEP 9: Set a Strict Geofence

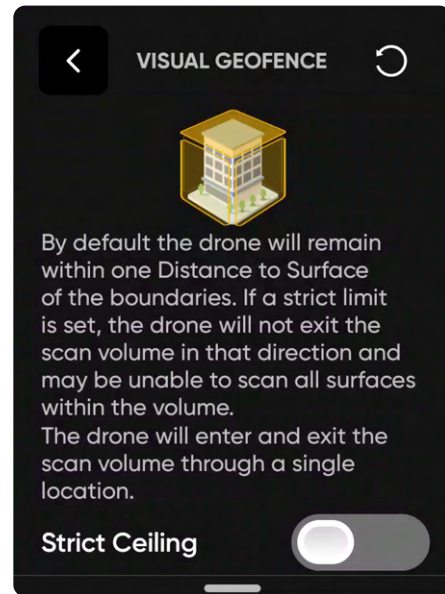
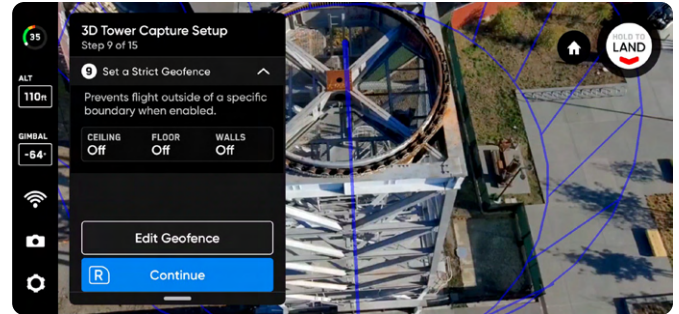
Enables a strict geofence around the scan volume. The Visual Geofence uses the drone's visual navigation system to enter and exit from the closest point on the geofence, minimizing travel outside of the geofence boundaries.

Skydio will honor the Visual Geofence during the Explore phase and the scanning process, as well as when transitioning between the two. For more details, read the **Visual Geofence** section under 3D Capture Settings below.

To set the Visual Geofence, independently toggle strict or default geofence settings: **Ceiling**, **Floor**, and **Walls**. By default, Skydio will remain within the scan distance of the boundaries.

Enabling a strict geofence means each geofence blocks flight outside of the scan volume along that bound. The drone will continue to enter and exit the scan volume through the same location.

You will also see a setting called **Safe Distance**, which allows you to set the distance from which Skydio will stay away from the structure while scanning. **Read more details about this setting in the 3D Capture Settings section below.**



NOTE: Skydio will skip image capture locations that are located outside any of the toggled geofence boundaries. This may result in gaps in coverage.

STEP 10: Set AR Observer

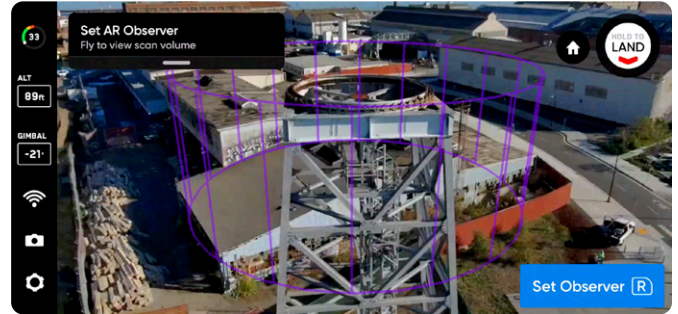
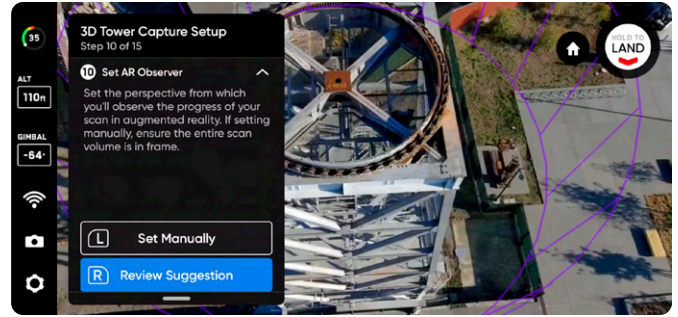
The Augmented Reality (AR) Observer allows you to set the point of view from which you can observe an augmented-reality view of the scan progress. When you set your AR Observer point, the drone will take a static image from that position. The AR drone will follow the white lines, which denote the planned flight path and image capture locations. The purple AR lines show the Wall Bounds.



Toggle to switch between the static AR Observer image and the drone's camera feed at any time during the scan.

There are two ways to set the AR Observer:

- **Review Suggestion** means Skydio will fly to the ceiling of the pillar closest to the takeoff position. The drone will then face the structure (the centroid of the AR polygon-prism).
- **Set Manually** allows you to manually pilot the drone to your preferred vantage point, using the Skydio Controller. If you choose to manually set the location of the AR Observer, ensure you are choosing a spot that provides you with the best situational awareness for monitoring the scan's progress.



Tips for manually setting the AR Observer

- Tightly frame the structure
- Fill the frame vertically or horizontally
- Select this option if you are scanning complex environments or around obstacles


STEP 11: Explore

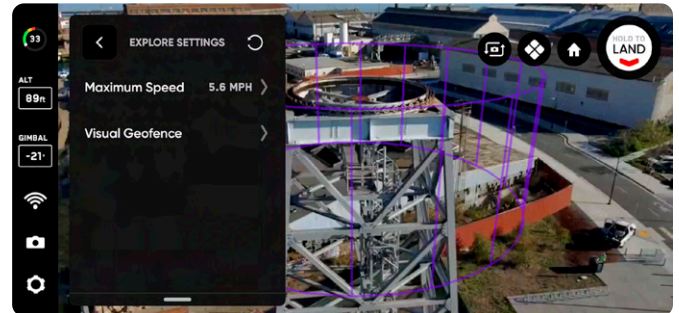
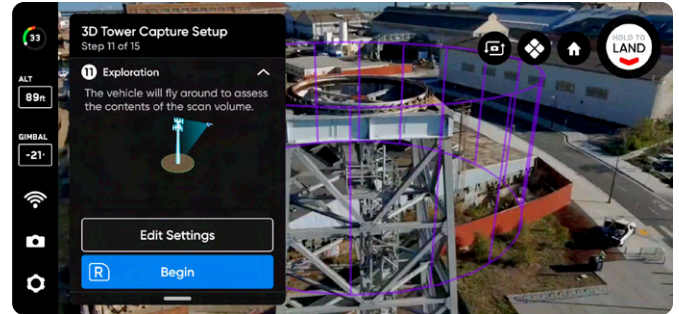
The drone will briskly and autonomously fly around the scan volume to build an internal model of the structure being scanned.

Skydio uses this internal model to intelligently predict overall scan time and number of capture points needed to complete the scan. The explore phase should be a small fraction of the total scan time, and a rough time estimate is given.

Select **Edit Settings** to adjust the speed at which your drone completes the Explore Phase.

- Minimum speed: is **1.1 mph (0.5 m/s)**
- Maximum speed: **11.2 mph (5 m/s)**
- Default speed: **11.2 mph (5 m/s)**

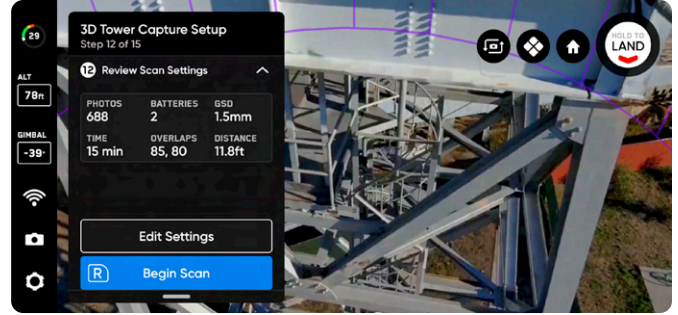
 Tap in the top right corner to toggle the AR Coverage Mesh.



STEP 12: Review or Edit Settings

View a summary of your scan settings, plus estimates for the total scan time, number of batteries needed and total number of photos. You must have at least five photos to begin a scan.

Editing scan settings will impact the total flight time, number of photos and the required number of batteries. See *3D Capture Settings* for more guidance.



Scan settings include:

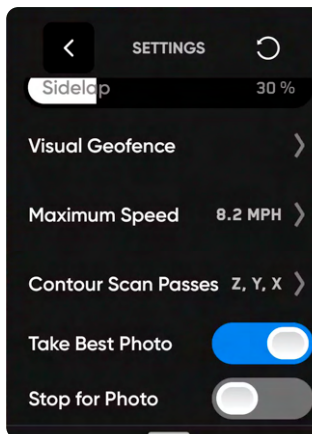
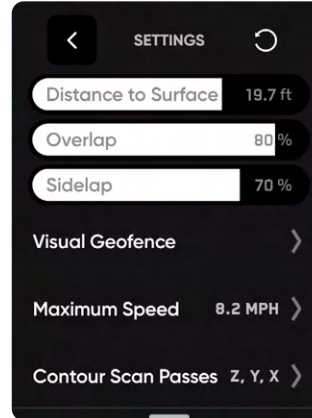
- Distance to Surface
- Overlap and Sidelap
- Visual Geofence
- Maximum Speed
- Contour Scan Passes (Z, Y, X)
- Take Best Photo
- Stop for Photo

Use the **Maximum Speed slider** to set the maximum speed at which Skydio will travel while exploring, scanning and when returning to the Launch Point or Rally Point.

- Minimum speed: **1.1 mph (0.5 m/s)**
- Maximum speed: **11.2 mph (5 m/s)**
- Default speed: **11.2 mph (5 m/s)**




Settings persist across scans of the same scan mode. Select the Reset button in the top right corner to restore settings to defaults.

Once your settings are finalized, you may select **Begin Scan** and Skydio will begin autonomously scanning the structure.



STEP 13: Scan

On the live camera feed you will see AR markers showing the scan capture points.

-  Optionally toggle on the AR Coverage Mesh during your scan to monitor the photo coverage progress of the scan. Learn more about this feature in the *AR Coverage Mesh* section.
-  Pause at any point during your scan. Use the left shoulder button or tap this icon in the workflow pane to pause scanning. Skydio will display how many photos have been captured. While paused, you have the option to manually capture photos using the right shoulder button.
-  Press the play icon or use the left shoulder button to resume autonomous scanning. Use the right shoulder button during a scan to Skip the next capture point.

Your scan may require multiple batteries. For more information, see the *Scanning with Multiple Batteries* section.

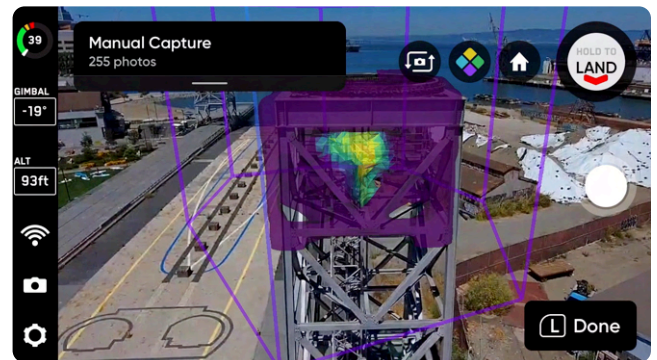
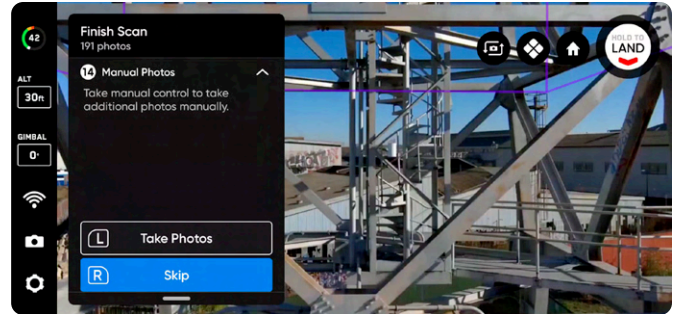


STEP 14: Manually Capture Photos (optional)

Once your scan completes, you will be given the option to manually capture more photos of the scene or details of specific areas of interest.

- The purple AR outline on-screen shows the Wall Bounds
- Use the right shoulder button to take a photo
- Manual photos will show up in the scan folder and in the Edge Model Viewer alongside the autonomously captured photos

Obstacle Avoidance set to Standard—and cannot be changed—when Skydio flies autonomously. If you are manually piloting the drone, you have the option to adjust your obstacle avoidance setting within the Device Settings menu.



NOTE: Manual photos may be captured at any time by pressing pause. You may also optionally enable interval mode to have the drone take photos at different time intervals (ex: capture a photo every 5 seconds).



CAUTION: Skydio obstacle detection does not detect moving objects and is disabled during landing. Review the Skydio Safety and Operating Guide for more information.

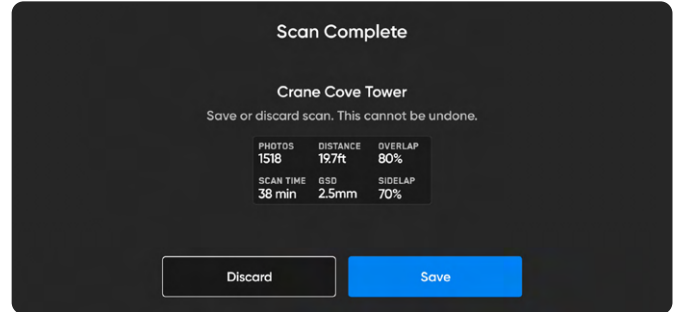
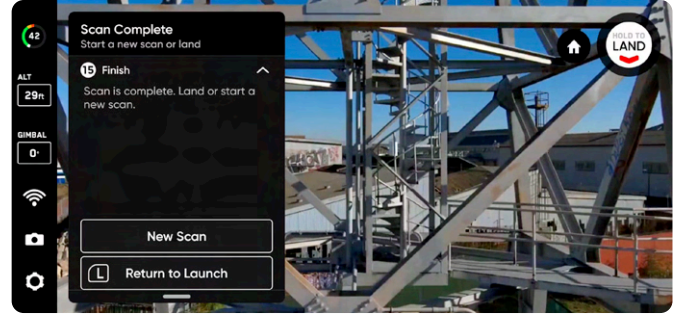
STEP 15: Scan Complete

Once the scan completes, you will have the option to either start a new scan or Return to Launch or Return to Rally if a manual rally point was set.

Starting a new scan will prompt you with an option to save or discard the scan you just completed. If you Return to Launch or Return to Rally and the path is clear, Skydio will obey the geofence and fly in a straight path to the chosen point. If Skydio cannot find that path due to obstacles, you will be able to take control and manually pilot your drone.

After landing, you will see a summary of the most recent scan and the option to save or discard the scan you completed. Select **Save** and wait for the drone to process your scan. This is an important step to ensure your media is grouped by scan and can be viewed in the Edge Model Viewer.

Once processing is complete, select **Finish** to return to the Fly Screen or **Review Scan** to enter the Edge Model Viewer.



CAUTION: Do not remove the battery or power off during post-flight processing. Doing so will result in loss of data. Do not power off or disconnect from the drone until you return to the Begin Flight screen.

Indoor Capture Overview

Refer to the table below for the default settings in this mode. For more detailed information about each setting, view the 3D Capture Settings section.

- Define the Floor, Ceiling and Wall Boundaries to create your **Inside Scan Volume**.
- By default, Indoor Capture extends the Inside Scan Volume by 16 ft (5 m) to incorporate spaces where the drone cannot physically fly, which creates the **Outside Volume**.
- Choose if you want to scan the **Inside Volume only**, **Outside Volume only**, or **both volumes**.
- Skydio will face outward to capture features located outside of the scan volume.
- Use the map to set a custom scan location when flying in GPS-denied environments.
- All Strict Geofence boundaries are **ON** by default, meaning Skydio will not physically leave the Inside Volume.

SETTING	DEFAULT
Strict Geofence	All bounds ON by default
Modify Scan Volume	Floor, Ceiling, and Walls enabled by default Distance is set to 16 ft (5 m)
Gimbal angle	0°
Scan passes	Z, Y, X enabled
Overlap/Sidelap	60/60
Speed (<i>applies when exploring and scanning</i>)	8 mph (3.5 m/s)
Other settings ON by default	Take Best Photo Optimize X, Y

Before you fly

- GPS is not required for Indoor Capture
- Be aware of thin obstacles such as wiring from ceiling lights
- Ensure the room is clear of small objects that could be affected by propeller downwash
- Do not scan in confined environments that are dimly lit
- Skydio does not avoid transparent or reflective surfaces, such as windows or mirrors greater than 60 in (152 cm)
- If needed, you can move backwards and re-do any steps in the workflow. Doing so will reset the steps you have already completed and discard any media that has been captured.
- **Indoor Capture is not recommended with Skydio X2 Color/Thermal** due to a more narrow field of view and a minimum focus distance of 16 ft (5 m), which results in a shorter focal distance
- If you do fly with a Skydio X2 Color/Thermal, capturing thermal images is on by default. You have the ability to disable thermal image capture in the camera settings.



CAUTION: Follow the [Skydio Safety and Operating Guide](#), as well as all civil aviation authority regulations and applicable local and federal laws.



Tips for setting up your scan

- The placement of the drone determines the angles at which it will capture photos during the X and Y passes. Consider placing the drone **parallel** to a wall (45°) to introduce more parallax for reconstructions.
- **If your scan will require more than one battery, take note of the exact position and orientation of launch.**
- Set the Floor as low as possible.
- Set the Ceiling as high as possible, keeping it below any obstructions such as wires or lighting.
- If you wish to scan the entire room, set the Wall AR pillars as close to the walls or edges of the room as possible.
- Enable **Scan Outside Pillars** if you wish to capture surfaces located outside of your scan volume.

Understanding the Visual Geofence and Modify Scan Volume in Indoor Capture

By default, all boundaries are set to a **Strict Geofence**. This means that the drone will not fly outside of the Floor, Ceiling, or Wall boundaries.

By default, **Modify Scan Volume** is enabled for all bounds. Indoor Capture extends the Inside Scan Volume by 16 ft (5 m) to incorporate spaces where the drone cannot physically fly, which is referred to as the Outside Volume.

There may be cases where you want to capture features that are outside of the initial scan volume, requiring an "outside in" view. In this case, select **Edit Volume** during the **Modify Scan Volume** step and enable **Scan Outside Pillars**. From here, edit the state of any relevant Strict Geofences.

- When a Strict Geofence is **OFF**, this means Skydio will move freely inside and outside of the scan volume
- If you leave a Strict Geofence **ON**, Skydio will skip image capture points that are located outside that boundary, which may result in gaps in coverage



WARNING: Ensure your indoor environment is safe (i.e. spacious and brightly lit), before turning off any Strict Geofence.

EXAMPLE

You are trying to capture all interior contents of a room, as well as the surfaces of the walls.

The room you are scanning has thin wires on the ceiling for lightning. When scanning an environment like this, it's important to take extra care to ensure the drone can safely navigate the space.

Aside from the wires, the room is well lit and clear of other obstacles and safety concerns.

- Set the Ceiling as high as possible while still staying below the wires
- Leave the **Strict Ceiling ON** to ensure that the drone stays within the boundaries of the scan volume

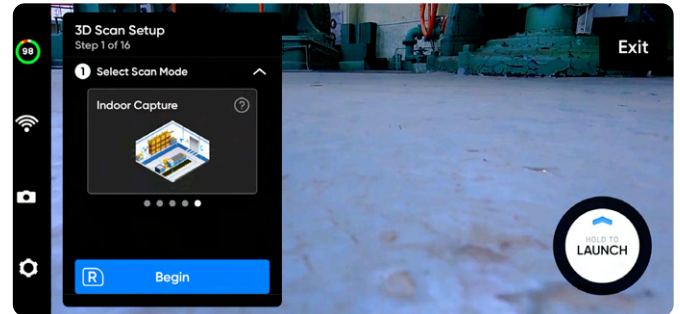
In this scenario, it may be possible to **disable** the **Strict Geofence** for the **Floor** and **Walls**, allowing the drone to fly freely throughout the interior of the room and the scan volume.

- With a Strict Ceiling **ON** and all other Strict Geofence bounds **OFF**, this means that after the drone exits the scan volume, it will rotate to face the volume and in turn capture the "outside in" views

Indoor Capture Workflow

STEP 1: Select Scan Mode

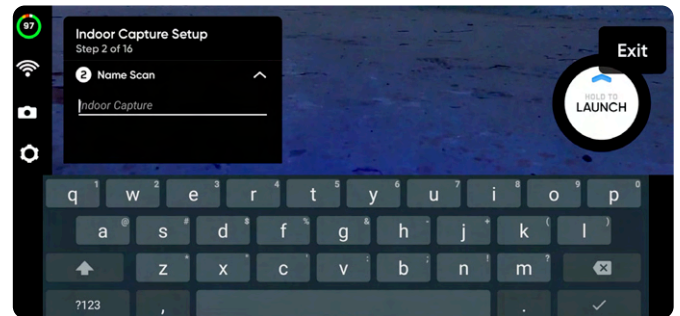
Select **Indoor Capture** as the Scan Mode. Tap **Begin** on the screen or use the right shoulder button on the Controller.



STEP 2: Name Scan Site (optional)

After selecting Begin, you may optionally rename your scan. The default scan name is composed of the scan mode you select followed by a UTC timestamp. Renaming the scan will replace the scan mode.

Ex: Indoor_Capture__2021-05-20T19-50-55.135854+00-00



Scan names must use American Standard Code for Information Interchange (ASCII) characters. Spaces, Unicode characters such as à, é, â, ü, ö, ä and the following symbols will be converted to underscores (_) in the scan directory name: < > ; \ | / ? * & \$ { } ` ' " Visit <https://skydio.com/support> for more information.

STEP 3: Set GPS Location

Using a satellite map, set the GPS location of your scan site and define the heading of the drone.

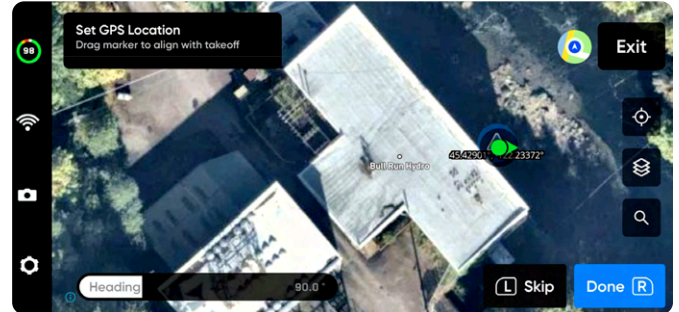
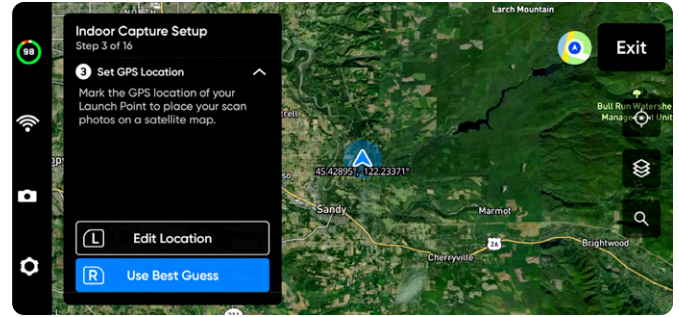
The location and heading you set will be used in the GPS metadata of your scan photos.

There are two ways to set your GPS location:

Edit Location allows you to manually mark the location of your scan site and drone position. Touch and drag the blue arrow to set the position of your drone, and use the Heading slider to adjust its orientation.

- Optionally use the **search bar** on the right of your screen to enter a specific location or coordinates
- Pinch and drag your fingers away from each other to digitally zoom in
- Pinch and drag your fingers toward each other to zoom out
- Default heading: 90°

Use Best Guess means Skydio will attempt to estimate your current location. Photo GPS locations will reflect the location of the drone at each capture point. If you are in a fully GPS-denied environment, all photos will have a 0,0 location.



STEP 4: Launch

Select and hold the **LAUNCH** button to begin your flight. The drone will automatically climb to 6.5 ft (2 m) and hover.

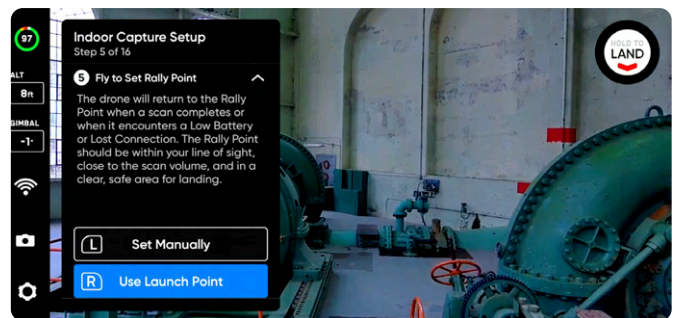


STEP 5: Set Rally Point

Once the scan completes, you will have the option to return to the Rally Point. Additionally, when the battery level is low or the drone loses connection, Skydio will return to the Rally Point.

To set your Rally Point, select one of the following options:

- **Use Launch Point** – drone will return to the launch location instead of a manually set Rally Point.
- **Set Manually** – allows you to use Skydio Controller to manually pilot the drone to a new location.



Tips for setting a Rally Point

- The Rally Point should be in your line of sight with a clear path to the Launch Point.
- Set your Rally Point close to the scan region so that the drone can safely and easily return to that point autonomously. Even if you change position during the scan, the drone will always have a point to return to safely without obstruction.
- Choose a location that is safe for landing.

STEP 6: Set Scan Floor

The Floor defines the bottom of the 3D volume you wish to scan. It will also define the bottom of your scan in the **Visual Geofence** and the **Edge Model Viewer**.

There are two ways to begin setting the Floor:

- **Use Default Height** starts the Floor at 1.6 ft (0.5 m) above the launch height. To ensure the ground is captured, Extend Capture Area > Below Floor is toggled on by default.
- **Set Manually** starts the Floor at the current height of the drone. Fly to place the Floor at your desired location.

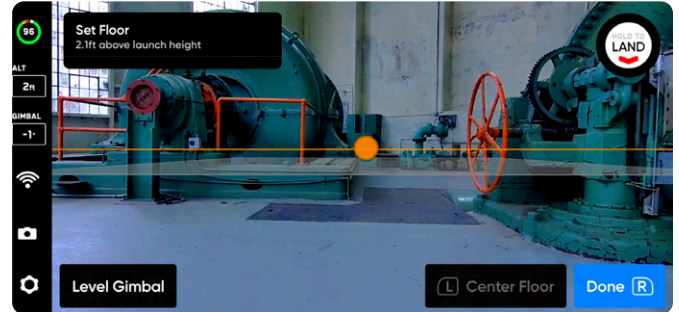
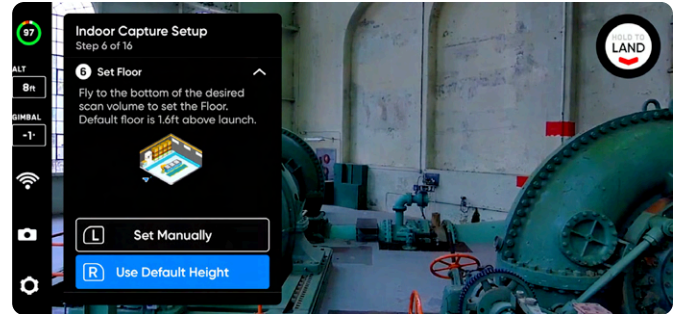
Once selected, adjust the Floor as desired:

- Pilot the drone and the Floor will automatically move with the drone as you fly
- Drag the orange Floor AR to the desired height

The Launch Height is represented by a light gray AR plane.

Use the Controller shortcuts to navigate the setup process:

- **Done** – Sets the Floor in your desired location and proceeds to the next step
- **Center Floor** – Moves the location of the Floor to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°



STEP 7: Set Scan Ceiling

The Ceiling defines the top of the 3D volume you wish to scan. It will also define the top of your scan in the **Visual Geofence** and the **Edge Model Viewer**.

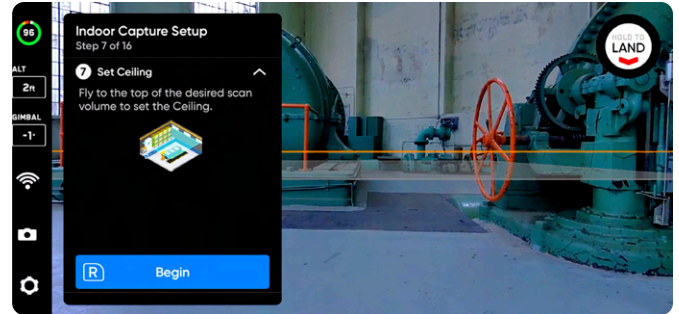
Press R to begin. The workflow pane will collapse to show a full-screen view of the green Ceiling AR. The Ceiling needs to be set above both the Floor and the structure you are scanning.

Adjust the Ceiling as desired:

- Pilot the drone and the Ceiling will automatically move with the drone as you fly
- Drag the green Ceiling AR to the desired height

Use the Controller shortcuts to navigate the setup process:

- **Done** – Proceeds to the next step
- **Center Ceiling** – Moves the location of the Ceiling to the current altitude of the drone
- **Level Gimbal** – Moves the camera gimbal pitch to 0°



STEP 8: Set Boundaries

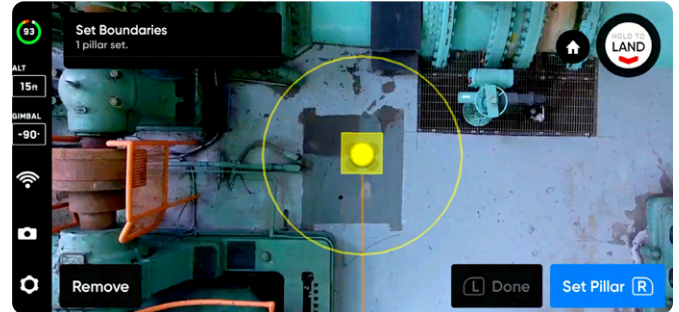
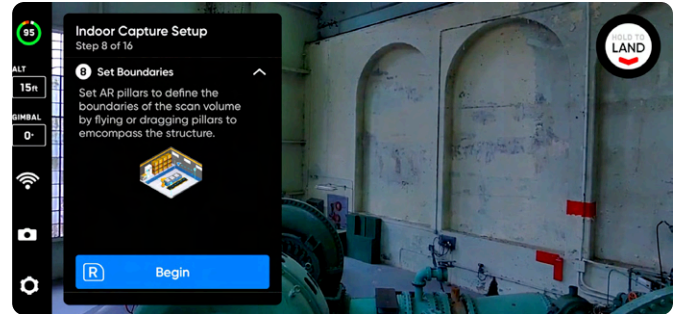
Set Augmented Reality (AR) pillars to outline the interior that will be scanned. These pillars define the lateral bounds for the **Visual Geofence** and the lateral area of your model in the **Edge Model Viewer**.

A minimum of three pillars must be set to create a 3D volume.

There are two options when setting pillars:

Fly to the desired location and use the right shoulder button to select **Set Pillar**. Continue placing pillars to encompass the entire structure. By default, pillars are attached to the drone. The edges of the polygon defined by the pillars must not cross each other.

- **Set Pillar** – Adds a new bounding pillar
- **Remove** – Removes the previous bounding pillar
- **Done** – Completes this step and finalizes pillar placement



TIP: If you wish to scan the entire room, set the pillars as close to the edge of the room as possible.

SCANNING WITH SPECIALIZED CAPTURE MODES / INDOOR CAPTURE

Drag Pillars by holding the base of the yellow AR Pillar on-screen. This selects the active pillar and enables dragging. You may continue to set pillars by dragging or reconnecting the pillar to the drone by selecting "Attach."

- **Set Pillar** – Adds a new bounding pillar
- **Done** – Completes this step and finalizes pillar placement
- **Attach** – Reconnects the pillar to the drone
- **Remove** – Deletes the previous bounding pillar



NOTE: The scan volume is automatically extended by 16 ft (5 m), meaning there is no need to drag your pillars behind a wall.



Only the current active pillar may be dragged.

STEP 9: Modify Scan Volume

Modify Scan Volume expands the scan volume **beyond** the Floor, Ceiling or Walls.

By default, your scan area is extended by 16 ft (5 m) along all bounds.

Use the adjustable distance slider to set the distance at which Skydio will capture photos outside of the scan volume.

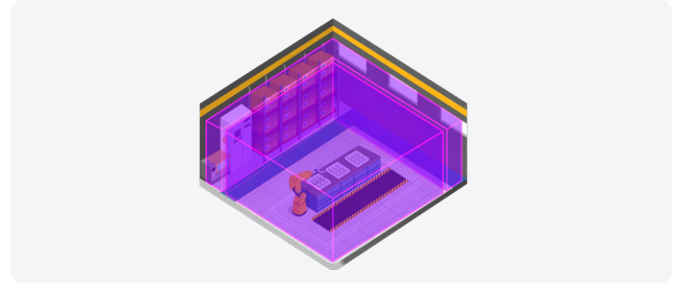
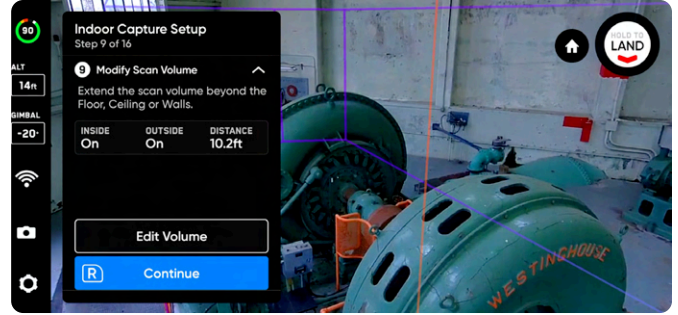
- Maximum distance: 26 ft (8 m)

If a **Strict Geofence is enabled**, the drone will face outward and capture photos of surfaces located outside of the scan boundaries **without physically flying there**.

There are two options when extending the capture area:

- **Scan Inside Pillars** captures everything that is located within the scan volume. Disabling this setting will exclude any structures within the scan volume.
- **Scan Outside Pillars** enables the drone to scan the area surrounding the initial scan volume, effectively performing an “inside out” scan. You may choose to extend beyond any of the three boundaries: Ceiling, Floor or Walls.

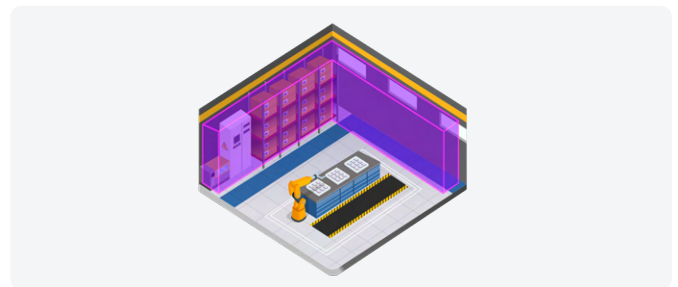
By default, Skydio will scan both the Inside Volume and Outside Volume. All Strict Geofences are **ON by default**, meaning the drone will stay within the boundaries you set, but face outward to capture photos of the walls or ceiling.



Scan both Inside Volume and Outside Volume (default)



Scan Inside Volume only



Scan Outside Volume only

STEP 10: Set a Strict Geofence

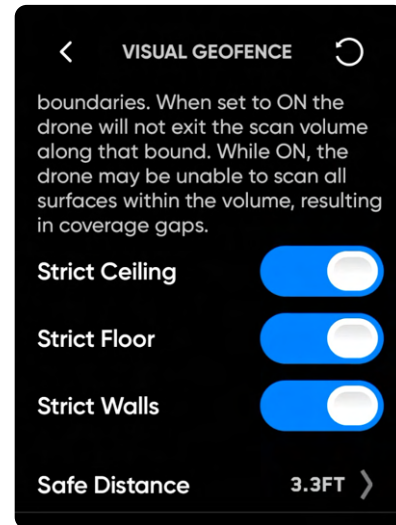
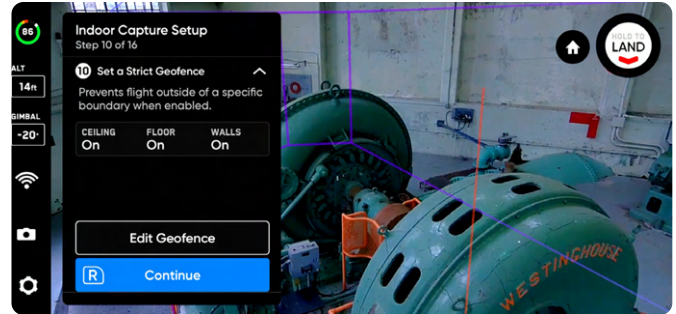
All three Strict Geofences are ON by default in Indoor Capture.

Independently toggle the Ceiling, Floor, and Walls **ON** or **OFF** to set the geofence. By default, Skydio will remain within the scan distance of the boundaries.

Enabling a strict geofence (toggling **ON**) blocks flight outside of the scan volume along that bound. The drone will continue to enter and exit the scan volume through the same location.

Skydio will honor the Visual Geofence during the Explore phase and the scanning process, as well as when transitioning between the two. *For more details, read the Visual Geofence section under 3D Capture Settings below.*

You will also see a setting called **Safe Distance**, which allows you to set the distance from which Skydio will stay away from the structure while scanning. *Read more details about this setting in the 3D Capture Settings section below.*



NOTE: Skydio will skip image capture locations that are located outside any of the toggled geofence boundaries. This may result in gaps in coverage.

STEP 11: Set AR Observer

The Augmented Reality (AR) Observer allows you to set the point of view from which you can observe an augmented-reality view of the scan progress.

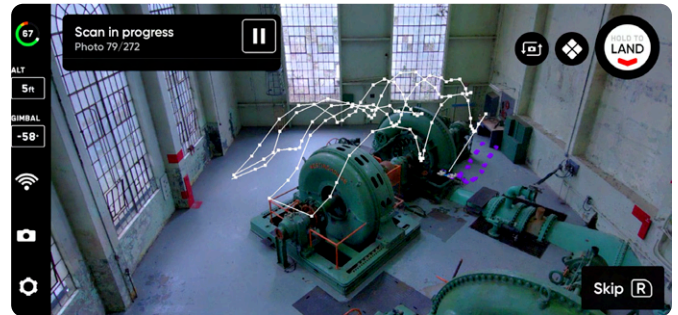
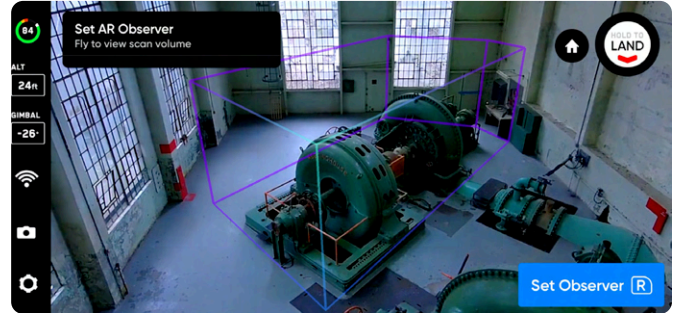
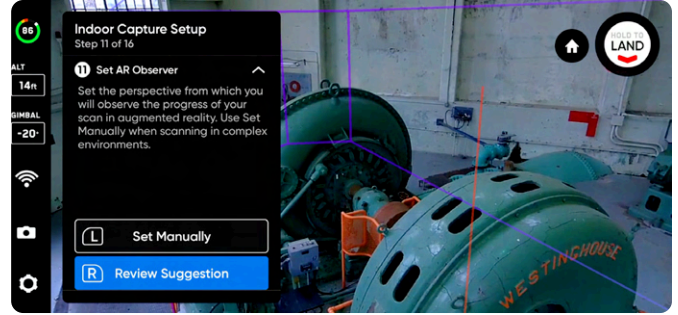
- When you set your AR Observer point, the drone will take a static image from that position
- The AR drone will follow the white lines, which denote the planned flight path and image capture locations
- The purple AR lines show the Wall Bounds



Toggle to switch between the static AR Observer image and the drone's camera feed at any time during the scan.

There are two ways to set the AR Observer:

- **Review Suggestion** means Skydio will fly to the ceiling of the pillar closest to the takeoff position. The drone will then face the structure (the centroid of the AR polygon-prism).
- **Set Manually** allows you to manually pilot the drone to your preferred vantage point, using the Skydio Controller. If you choose to manually set the location of the AR Observer, ensure you are choosing a spot that provides you with the best situational awareness for monitoring the scan's progress.



Tips for manually setting the AR Observer

- Tightly frame the structure
- Fill the frame vertically or horizontally
- Select this option if you are scanning complex environments or around obstacles

STEP 12: Explore

The drone will briskly and autonomously fly around the scan volume to build an internal model of the structure being scanned.

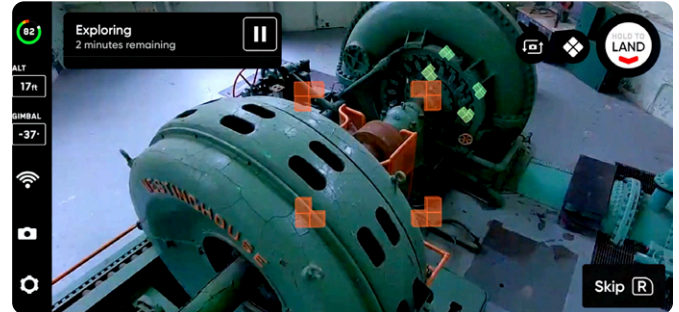
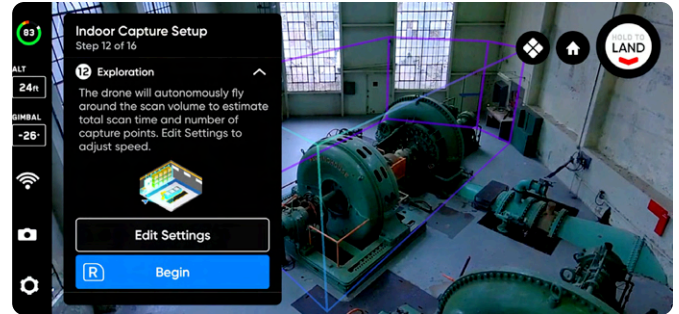
Skydio uses this internal model to intelligently predict overall scan time and number of capture points needed to complete the scan. The explore phase should be a small fraction of the total scan time, and a rough time estimate is given.

Select **Edit Settings** to adjust the speed at which your drone completes the Explore Phase.

- Minimum speed: **1.1 mph (0.5 m/s)**
- Maximum speed: **8 mph (3.5 m/s)**
- Default speed: **8 mph (3.5 m/s)**



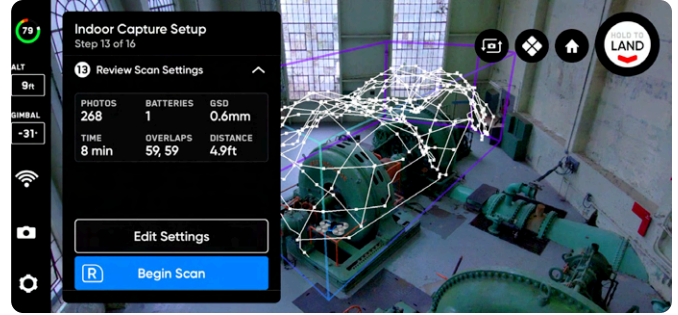
Tap to toggle the AR Coverage Mesh.



STEP 13: Review or Edit Settings

View a summary of your scan settings, plus estimates for the total scan time, required number of batteries, and total number of photos. You must have at least five photos to begin a scan.

Editing scan settings will impact the total flight time, number of photos and the required number of batteries. See *3D Capture Settings* for more guidance.



Scan settings include:

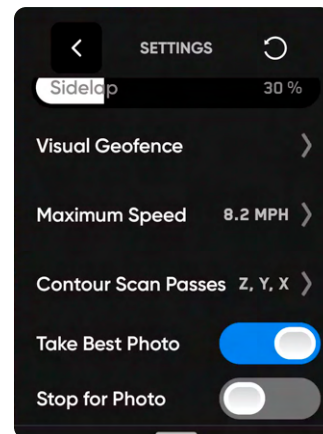
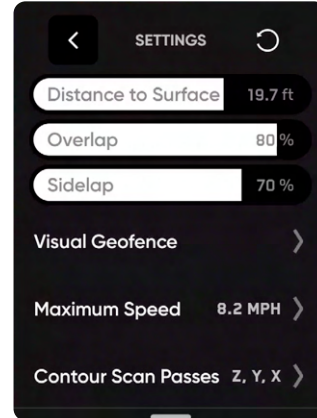
- Distance to Surface
- Overlap and Sidelap
- Maximum Speed
- Contour Scan Passes (Z, Y, X)
- Take Best Photo
- Stop for Photo

Use the **Maximum Speed slider** to set the maximum speed at which Skydio will travel while exploring, scanning and when returning to the Launch Point or Rally Point.

- Minimum speed: 1.1 mph (0.5 m/s)
- Maximum speed: 8 mph (3.5 m/s)
- Default speed: 8 mph (3.5 m/s)


Settings persist across scans of the same scan mode. Select the Reset button in the top right corner to restore settings to defaults.


Once your settings are finalized, you may select **Begin Scan** and Skydio will begin autonomously scanning the room.




STEP 14: Scan

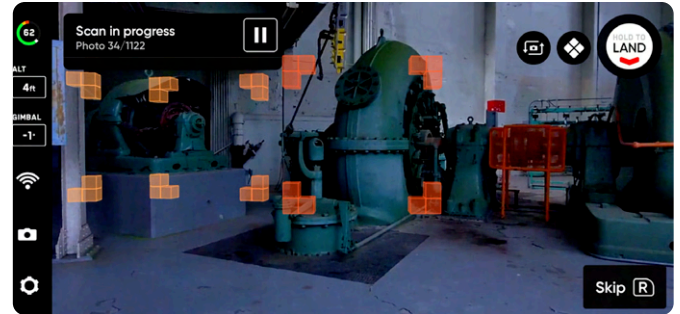
On the live camera feed you will see AR markers showing the scan capture points.

-  Optionally toggle on the AR Coverage Mesh during your scan to monitor the photo coverage progress of the scan. Learn more about this feature in the *AR Coverage Mesh* section.

-  Pause at any point during your scan. Use the left shoulder button or tap this icon in the workflow pane to pause scanning. Skydio will display how many photos have been captured. While paused, you have the option to manually capture photos using the right shoulder button.

-  Press the play icon or use the left shoulder button to resume autonomous scanning. Use the right shoulder button during a scan to Skip the next capture point.

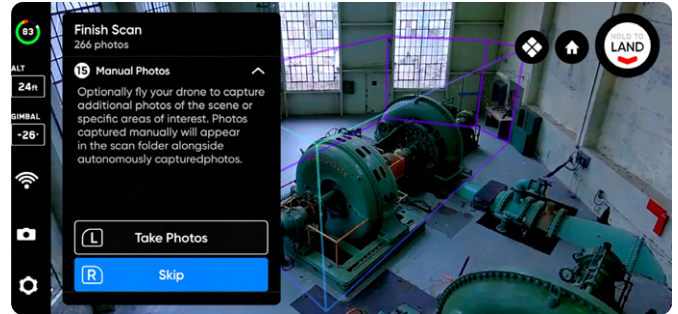
Your scan may require multiple batteries. *For more information, see the Scanning with Multiple Batteries section.*



STEP 15: Manually Capture Photos *(optional)*

Once your scan completes, you will be given the option to manually capture more photos of the scene or details of specific areas of interest.

- The purple AR outline on-screen shows the Wall Bounds
- Use the right shoulder button to take a photo
- Manual photos will show up in the scan folder and in the Edge Model Viewer alongside the autonomously captured photos



Obstacle Avoidance set to Standard—and cannot be changed—when Skydio flies autonomously. If you are manually piloting the drone, you have the option to adjust your obstacle avoidance setting within the Device Settings menu.



NOTE: Manual photos may be captured at any time by pressing pause. You may also optionally enable interval mode to have the drone take photos at different time intervals (ex: capture a photo every 5 seconds).



CAUTION: Skydio obstacle detection does not detect moving objects and is disabled during landing. Review the Skydio Safety and Operating Guide for more information.

STEP 16: Scan Complete

Once the scan completes, you will have the option to either **start a new scan** or **Return to Launch** or **Return to Rally** if a manual rally point was set.

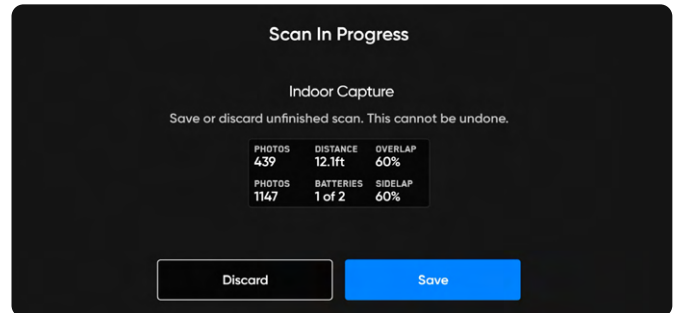
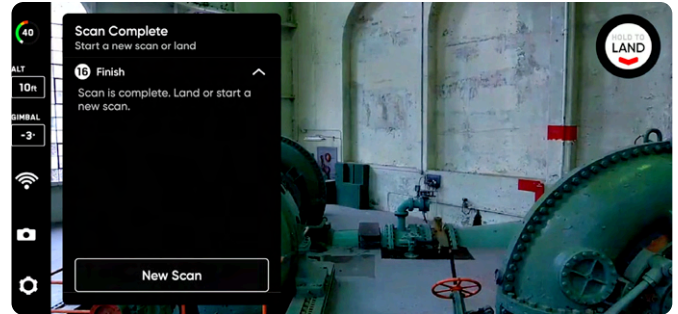
Starting a new scan will prompt you with an option to save or discard the scan you just completed.

- If you Return to Launch or Return to Rally and the path is clear, Skydio will obey the geofence and fly in a straight path to the chosen point
- If Skydio cannot find that path due to obstacles, you will be able to take control and manually pilot your drone

After landing, you will see a summary of the most recent scan and the option to save or discard the scan you completed.

Select **Save** and wait for the drone to process your scan. This is an important step to ensure your media is grouped by scan and can be viewed in the Edge Model Viewer.

Once processing is complete, select **Finish** to return to the Fly Screen or **Review Scan** to enter the Edge Model Viewer.

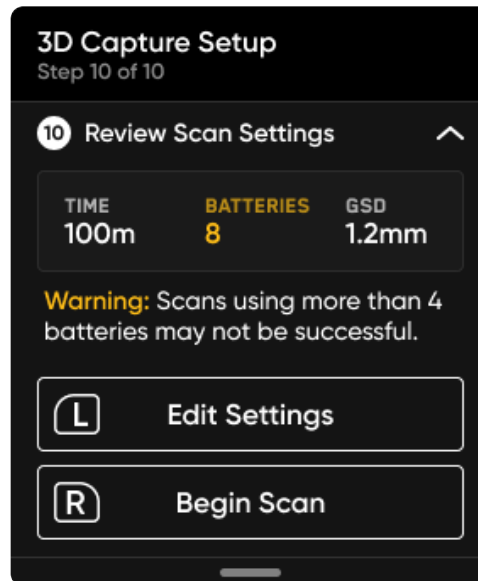


CAUTION: Do not remove the battery or power off during post-flight tasks. Doing so will result in loss of data. Do not power off or disconnect from the drone until you return to the Begin Flight screen.

Scanning with Multiple Batteries

Using computer vision, Skydio can resume scans across multiple battery changes without reliance on GPS.

We recommend flying scans that require no more than 4 batteries. During the Review Scan Settings step, you will see a scan summary which includes the total scan time and estimated number of batteries. If your total number of batteries is greater than four, consider adjusting your settings or split the volume into separate scans.



CAUTION: Wait to remove the depleted battery until all post-flight tasks are complete. Do not remove or swap out the Logs Card or Media Card between flights of the same scan. Removing either card when replacing a depleted battery will result in your drone being unable to resume the scan.

How to Change Batteries Mid-Scan

When the battery has about 18–25% charge (or 3 minutes of flight time) remaining, your drone will follow **Low Battery procedures** and return to the Rally Point. You will have the option to Land Now or Take Control to reposition your drone for landing.

To change batteries mid-scan:

1. Land your drone and save the current scan.
2. Wait to remove the depleted battery until all post-flight tasks are complete.
3. Power off your drone, remove the depleted battery and replace.
4. Power on your drone and wait as Skydio automatically connects.
5. To successfully resume a scan after replacing the battery, **the drone must take off from the exact same position and orientation between each flight**. Taking off in a different location or orientation will result in errors when attempting to resume your scan. **We strongly recommend taking off from the Skydio case.**

After replacing the battery, launch to begin your flight. You should see an option to either continue the scan or begin a new scan. Select **Continue** when prompted to resume a scan.



GOOD – Place at the center of the case logo facing forward in the same spot every flight.



BAD – Do not place the drone askew or in a different location from where you took off in the previous flight.

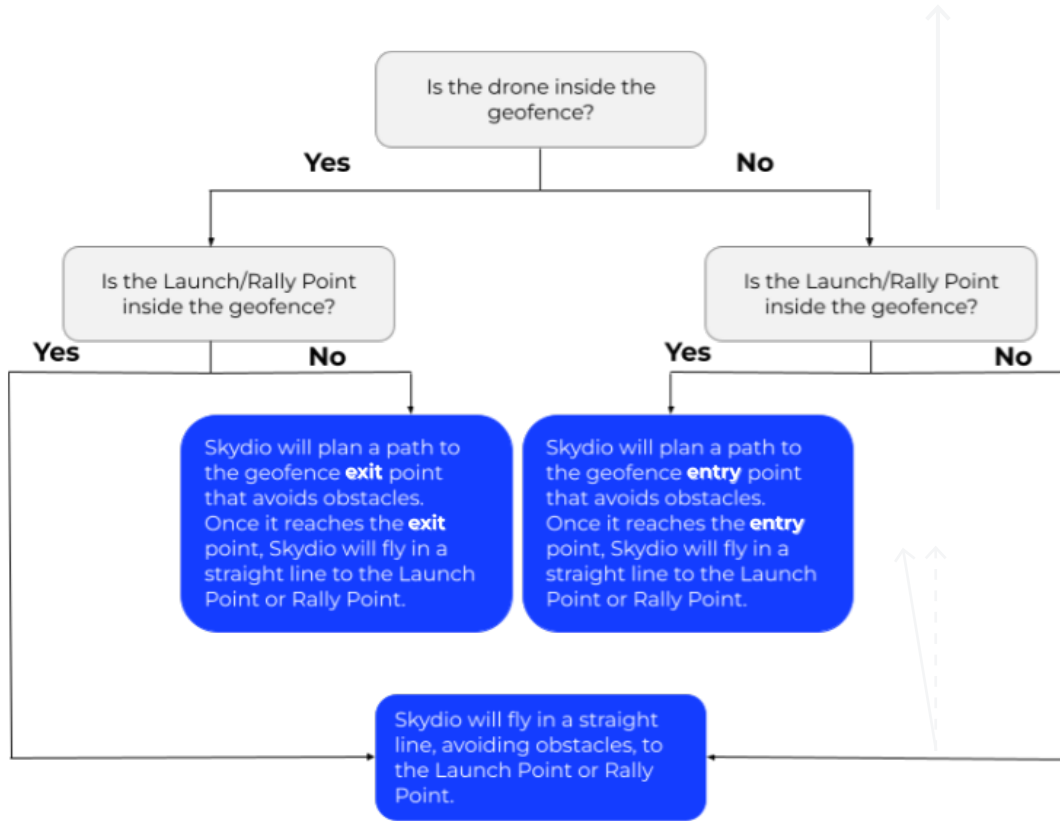


CAUTION: Do not power off until all post-flight tasks are complete. Do not remove the Media Card or the Logs Card between flights of the same scan. Removing either card when replacing a depleted battery will result in your drone being unable to resume the scan.



NOTE: While you should always select **Save** before completing a battery swap, Skydio will automatically save your scan before removing the depleted battery.

Return Behaviors during a 3D Capture or Tower Capture with geofences enabled:



Return Behaviors during a 3D Capture with geofences enabled:

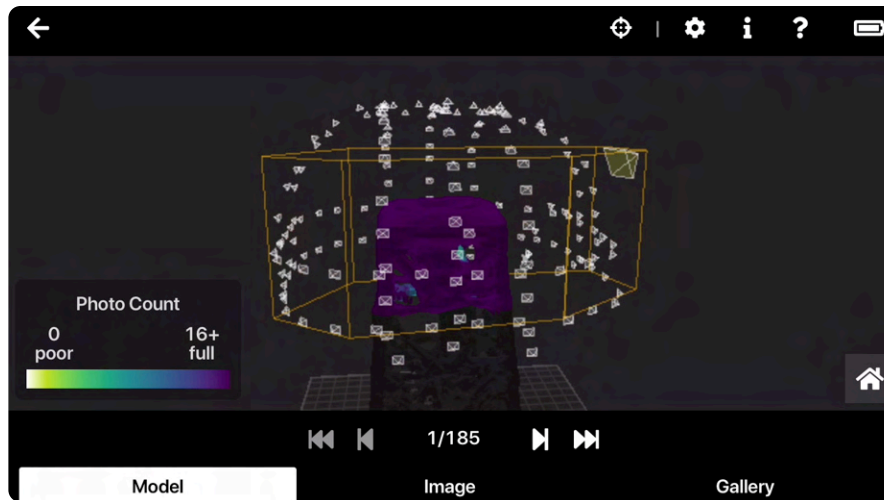
If both your drone and the Launch/Rally Point are **inside** the geofence, Skydio will maintain the same altitude as the scan Height and fly in a straight line to the Launch/Rally Point. Once it reaches either location, it will descend and hover above the point.

If either the drone or the Launch/Rally Point is located **outside** the geofence, Skydio will plan a path to the geofence entry or exit point then fly at the same altitude as the scan Height to the Launch/Rally Point. Once it reaches either location, it will descend and hover XX m above the point.



NOTE: The geofence entry or exit path is defined as the location on the geofence that is closest to the Launch Point or Rally Point location.

Edge Model Viewer



The Edge Model Viewer promptly generates photosets and enables intelligent photo browsing in the field for real-time inspection and decision-making. Use this tool to preview scans directly in-app or on a laptop after a flight.

Accessing the Edge Model Viewer

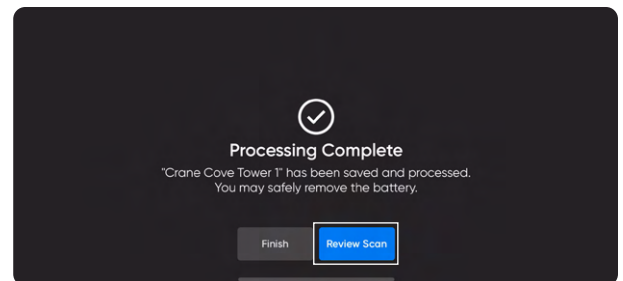
To open the Edge Model Viewer **within the Skydio Enterprise app**, simply select **Review Scan** after completing a scan.

You may also open it by following these steps:

1. Navigate to the **REVIEW** tab in the bottom left. Wait a moment while the scan thumbnails sync in the Skydio Enterprise app.
2. Tap on the scan you would like to view. The Edge Model Viewer will automatically open with this scan loaded.

To access the Edge Model Viewer **on a laptop or other mobile device** follow the steps below:

1. Make sure you are connected to the drone's WiFi. In your web browser, navigate to <http://192.168.10.1/viewer>
2. Select a scan from the dropdown menu. Click **X** in the top right to close the scan selection window.



If you are having trouble loading the Edge Model Viewer, turn off LTE data to ensure your device connects to the drone's wifi.

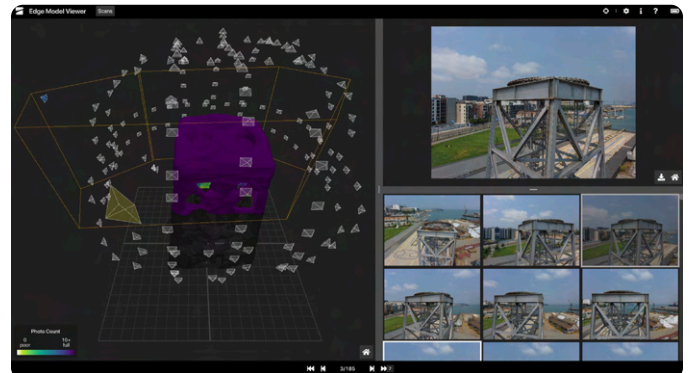
Navigating the Edge Model Viewer

Once the scan loads, you will see three separate tabs at the bottom of your screen. On larger screens, these tabs appear as resizable windows:

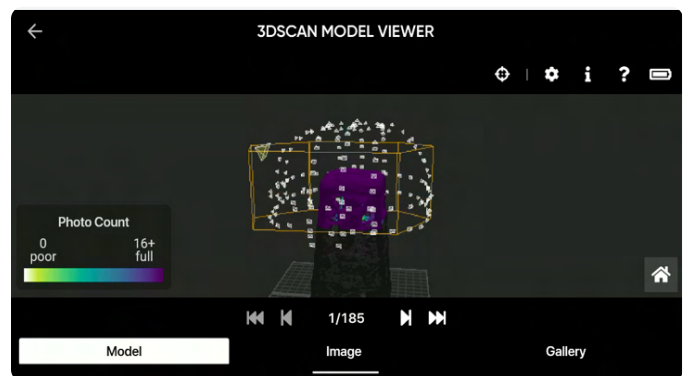
- **Model** previews a 3D reconstruction of your structure or area. The Edge Model Viewer will begin in this tab by default
- **Image** shows the individual image associated with the selected capture point
- **Gallery** shows all photos taken during the scan. When using the Inspect Tool, the Gallery will show all images containing that specific point

Zoom in and out by pinching with two fingers. Drag to navigate around the model. While dragging you will see green, blue and red colored axes which mark the pivot point. Double-click on the model to center the view on that point.

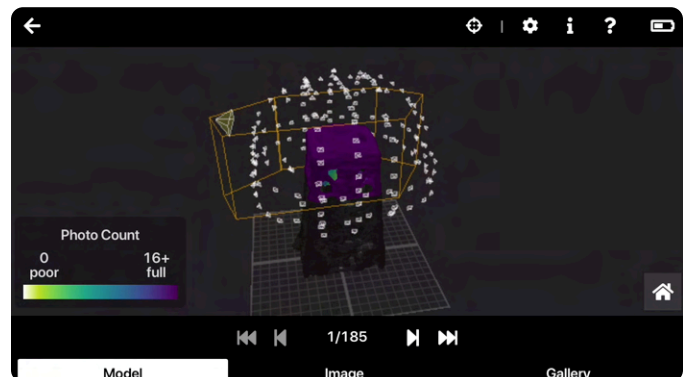
Use the arrows at the bottom of the screen to navigate through individual images and capture points on the model. Any time the active thumbnail changes, the image gallery will update to that view. Select the Help ? menu for a breakdown of the navigation controls.



Web browser view



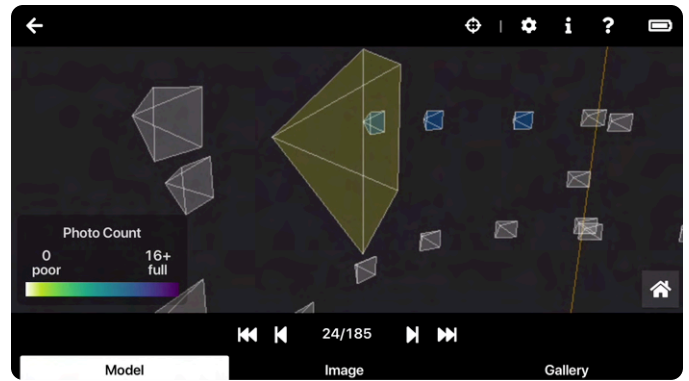
Android mobile view



iOS mobile view

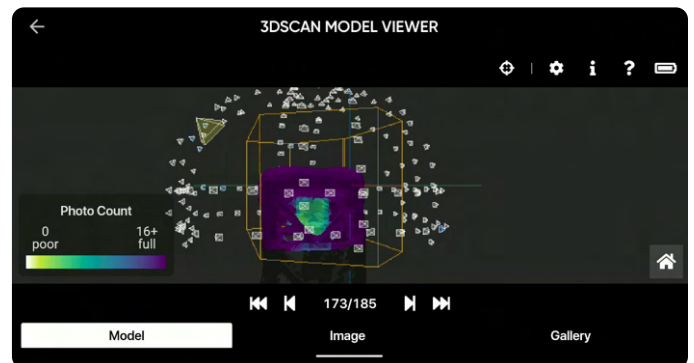
Capture Points

Select individual capture points to view photos. Once selected, the frustum will turn blue to denote you have already viewed that point.



Coverage Heatmap

You'll notice a coverage heatmap over the structure. This indicates how many photos were taken at each location. The photo count defines the coverage mesh colors in relation to the number of photos taken. Minimum and maximum photo numbers scale with your scan's overlap settings. Yellow indicates minimal coverage and purple indicates full coverage.

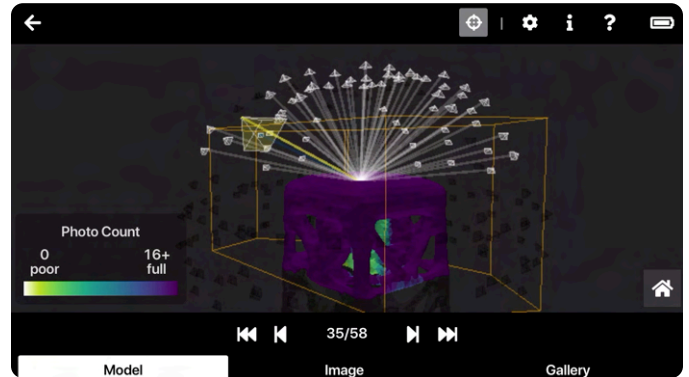


Toolbar

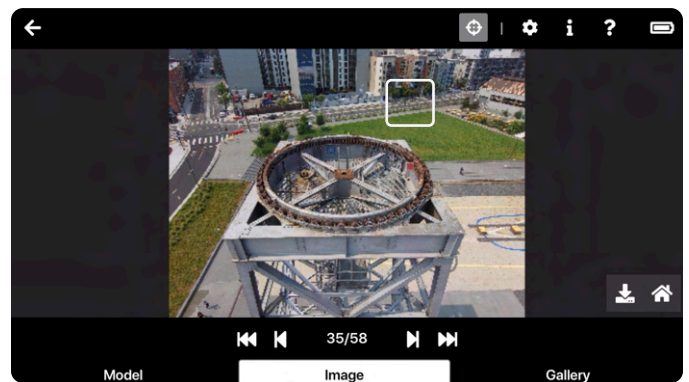
In the top right of the screen, there is a toolbar with the following icons:

Inspect Tool

Allows you to pick any point on the model and filter for all images containing that specific point.




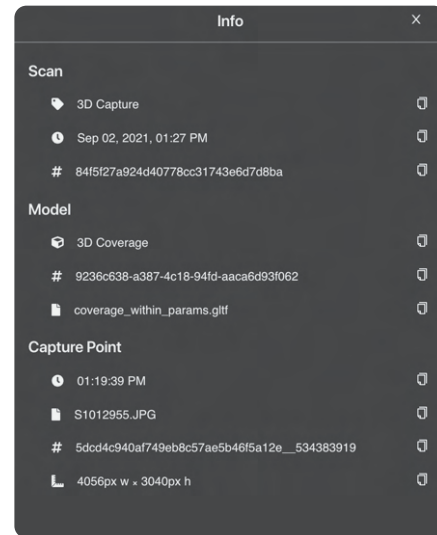
A red marker will appear on both the model and photo to show your current placement. Use this tool in the field to review the settings and angles you chose and see where images are spatially located in relation to the model.



Info

Summarizes information about the scan, the model and the image that is currently selected. This includes data such as the date and time of the scan, image size, and scan name.

To copy any of this information to your clipboard, press the  icon to the right.



Help

Outlines directions about controls and how to navigate the Edge Model Viewer.


Expand

Enters fullscreen.

Battery

Indicates the battery level of your drone.

Downloading Images

In the Gallery panel, find the image you wish to download. Once selected, navigate to the Image panel and select the  icon. Photos download as **.JPG** files and include scan information such as the time, scan name, and dimensions. You will have the option to rename your photo.




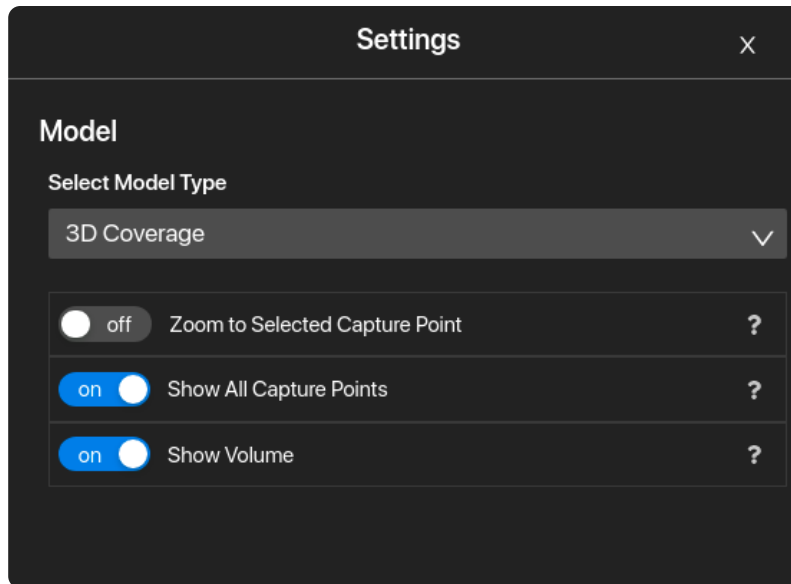
NOTE: Renaming downloaded images is unavailable for iOS.

Home

Resets to default view.

Edge Model Viewer Settings

Locate the following settings by clicking the  icon in the top right of your screen.



Select Model Type

- **3D Coverage** – Shows a photo coverage map that matches the in-flight AR Coverage Mesh. This is the only option for 3D Capture.
- **2D Coverage** – Highlights the idealized plane at the bottom of the scan volume. This is the only option for 2D Capture.

Zoom to Selected Capture Point

Automatically aligns the 3D view with the active capture point.

Show All Capture Points

Shows all capture points. When toggled off, this hides other points and shows only the active camera selected.

Show Volume

Adds a yellow prism around the structure to denote the user-defined scan volume.

Scan Settings

Photo Settings

Based on the available lighting conditions, your drone will automatically adjust photo settings to ensure it captures the best quality images. You will see in-app notifications alerting you if there are problems with the lighting conditions.

For consistency with reconstructions, Skydio recommends leaving all photo settings set to default. If needed you do have the ability to adjust the following:

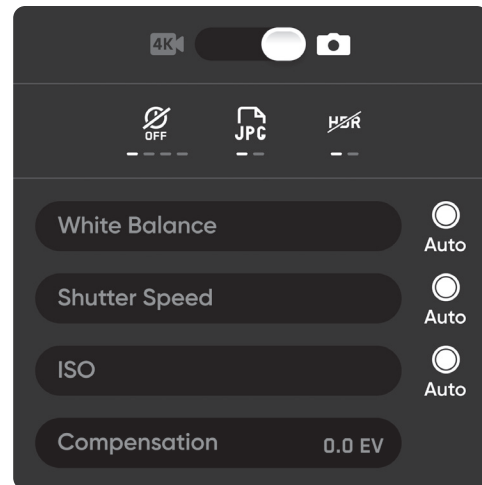
- Photo Interval*
- Off / 1s or 2s** / 5s / 10s
- HDR On/Off
- JPG / JPG+DNG***
- White Balance
- Shutter Speed
- Exposure

* When Photo Interval is enabled your drone will continuously capture photos at the specified time interval until the setting is disabled or the flight ends. Available in the Manual Capture step of a 3D Capture.

** The fastest interval photo setting when capturing in raw DNG is two seconds. You may capture a photo every one second when capturing in JPG mode.

*** DNG photos are not displayed in the media tab of the Skydio Enterprise app or Skydio Cloud and may be retrieved directly from the microSD card.

DNG must be enabled for each independent 3D Scan and your settings will NOT persist. DNG photos can only be captured when 'Stop for Photo' is enabled. If you enable DNG capture this will automatically toggle Stop for Photo.



3D Capture, Tower Capture, and Indoor Capture Settings

Settings will persist between scans and between flights. If you would like to restore settings back to default, select the reset button in the top right on the workflow pane during the Review or Edit Settings steps of a scan.

Overlap Percentage

Overlap between photos along a path. The default overlap is 80%; high overlap is recommended for complex scenes.

Sidelap Percentage

Sidelap between two adjacent flight paths. The default sidelap is 70%; high sidelap is recommended for complex scenes.

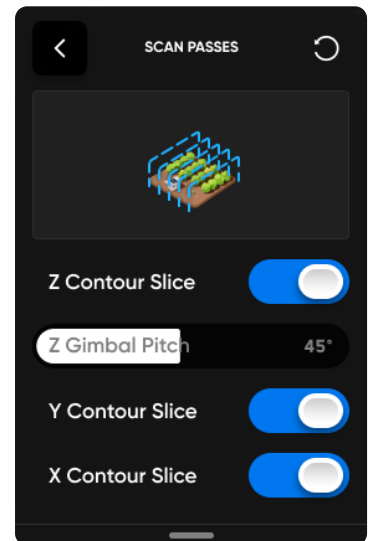
Scan Passes

Organizes the capture path into three continuous slices, **Z**, **Y**, and **X**.

The Z slices are completed first and resemble orbits at fixed heights going around the structure. By default, the camera gimbal angle is set to 15°. Use the **Z Gimbal Pitch** slider to adjust the camera angle at which the drone will capture photos while orbiting. Increased gimbal pitch results in capturing less sky and more photos of the surrounding area and structure itself.



The camera gimbal pitch represents the angle below the horizon.



SCAN SETTINGS / 3D CAPTURE, TOWER CAPTURE, AND INDOOR CAPTURE

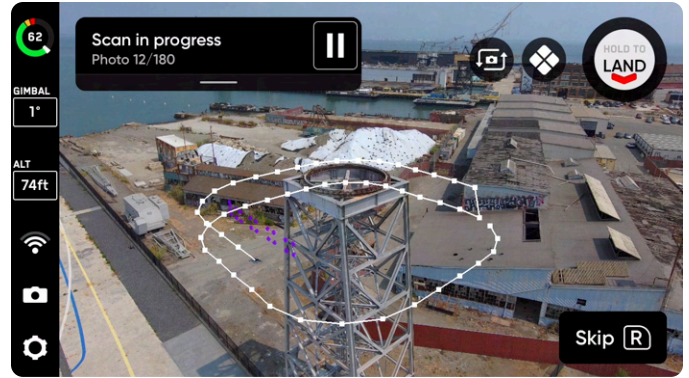
Adjusting the Z Gimbal Pitch is useful in situations where:

- You want to capture the ground in every photo for improved reconstructions
- You intend to leverage third party reconstruction software and want to minimize the number of photos containing sky
- You need to include the ground in your photos to capture Ground Control Points (GCP) at your scan site

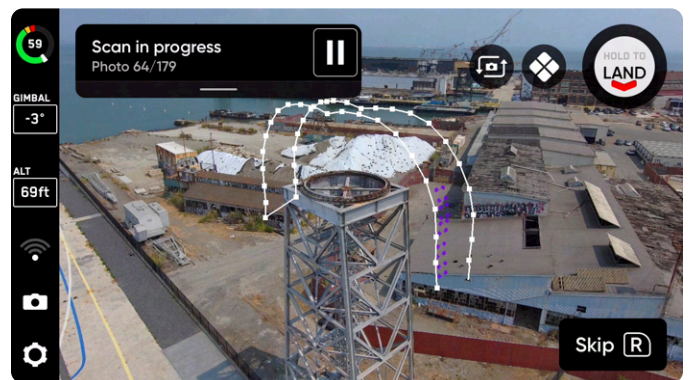
If you are using the Z Slice to efficiently capture large, relatively simple vertical surfaces (e.g., facades), we recommend leaving the default Z Gimbal Pitch. If you have **only** the Z Slice enabled, we recommend adjusting the Z Gimbal Pitch to zero.

The Y and X slices follow and resemble a cross hatch pattern.

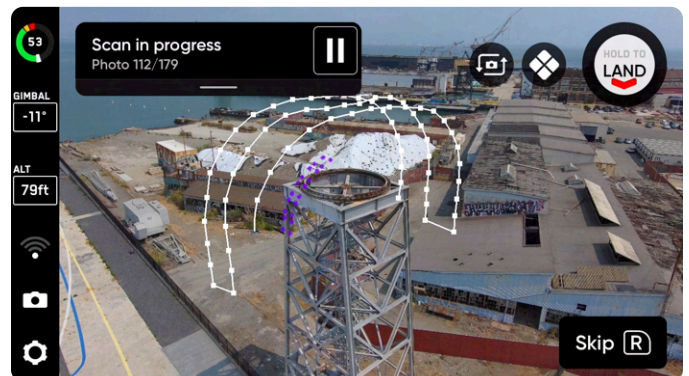
We recommend leaving all three slices enabled. You have the option to independently toggle each of the scan slices as needed. If all three slices are disabled, you will be unable to start the scan.



Z Slice



Y Slice



X Slice



Toggle on only the Z scan pass for faster scans around structures that do not need to be viewed from above or below.

Distance to Surface


Determines how close the drone will fly to the structure or area being scanned. Smaller distance to surface (closer) means more photos taken and higher resolution, but an increased total scan time. The Distance to Surface corresponds directly to Ground Sample Distance (GSD) which defines the distance between two consecutive pixel centers on the ground. For example, a one-millimeter GSD would suggest that the distance of the two consecutive pixel centers in the photo reflects one millimeter on the ground.

For tables that show GSD values at various fixed Distance to Surface, refer to the **Distance to Surface** section below.



The minimum surface distance is about 5 ft (1.5 m) for 3D Scan. The maximum surface distance is 26.2 ft (8 m) for 3D Scan.

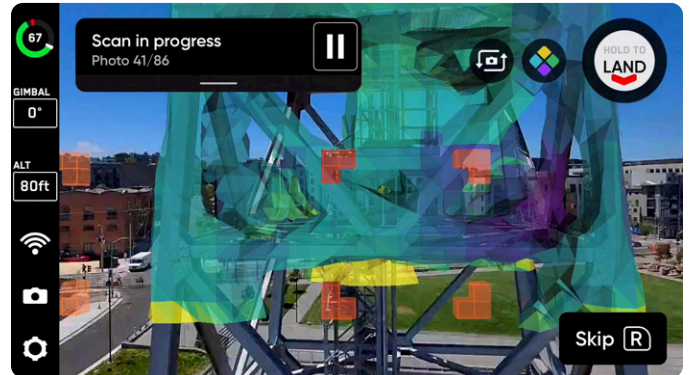
AR Coverage Mesh

The AR Coverage Mesh allows you to monitor the photo coverage progress of your scan. Tap the  icon to display real-time AR photo coverage of your scan.

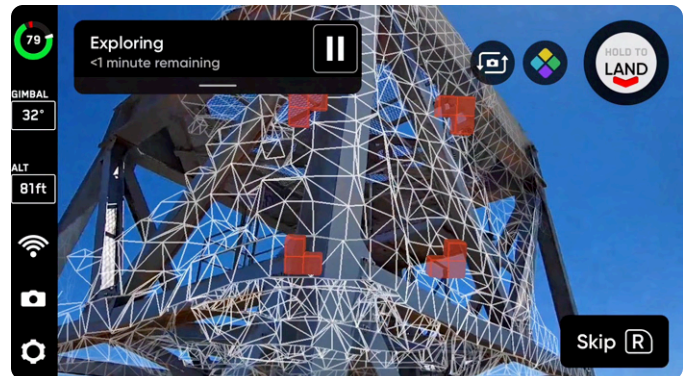
Ensure coverage of key areas and enable the AR Coverage Mesh:

- During the Explore phase
- When reviewing scan settings
- Live while scanning
- When viewing the scan in the AR Observer
- During manual capture

Yellow indicates minimal coverage and purple indicates full coverage based on your chosen overlap settings.



AR Coverage Mesh toggled on during scan



AR Coverage Mesh wireframe toggled on during Explore



NOTE: Images are not captured during the explore phase, but the coverage mesh will show the low-poly map building process.

Visual Geofence

The Visual Geofence gives you the ability to further constrain the drone to a safe flight area while scanning autonomously. By default, the drone will remain within an area defined by the scan volume and the scan distance.

The Visual Geofence uses the drone's visual navigation system to always enter and exit the 3D volume from the same location without the use of GPS. Skydio will honor the Visual Geofence during the Explore phase and the scanning process, as well as when transitioning between the two.

This setting gives you the ability to toggle on or off three independent visual geofences: Ceiling, Floor, and Walls. When enabled, each geofence blocks flight outside of the scan volume along that plane. If an image capture point is located outside of a toggled fence boundary, Skydio will not fly there and instead skip those capture points.

- **Strict Ceiling** uses the maximum height geofence
- **Strict Floor** uses the minimum height geofence
- **Strict Walls** uses the lateral pillarwd geofence



For example, when scanning a bridge, toggle the Ceiling geofence to avoid flying over the bridge deck; if you are scanning close to private property, toggle the Lateral geofence to avoid flying over the property.

Safe Distance

When setting the Visual Geofence, you will see the option for another setting called **Safe Distance**. Enabling Safe Distance allows you to **set a minimum distance the drone will stay away from objects and structures during autonomous flight**. Safe Distance is not active when piloting manually.

For example, enable this setting if you want to avoid flying near or through obstacles, such as a lattice tower, during exploration or while scanning.



NOTE: Safe Distance can be set between 3.3–9.8 ft (1–3 m).

The Safe Distance value cannot be greater than the specified Distance to Surface. Use the smallest possible Safe Distance value for best results.

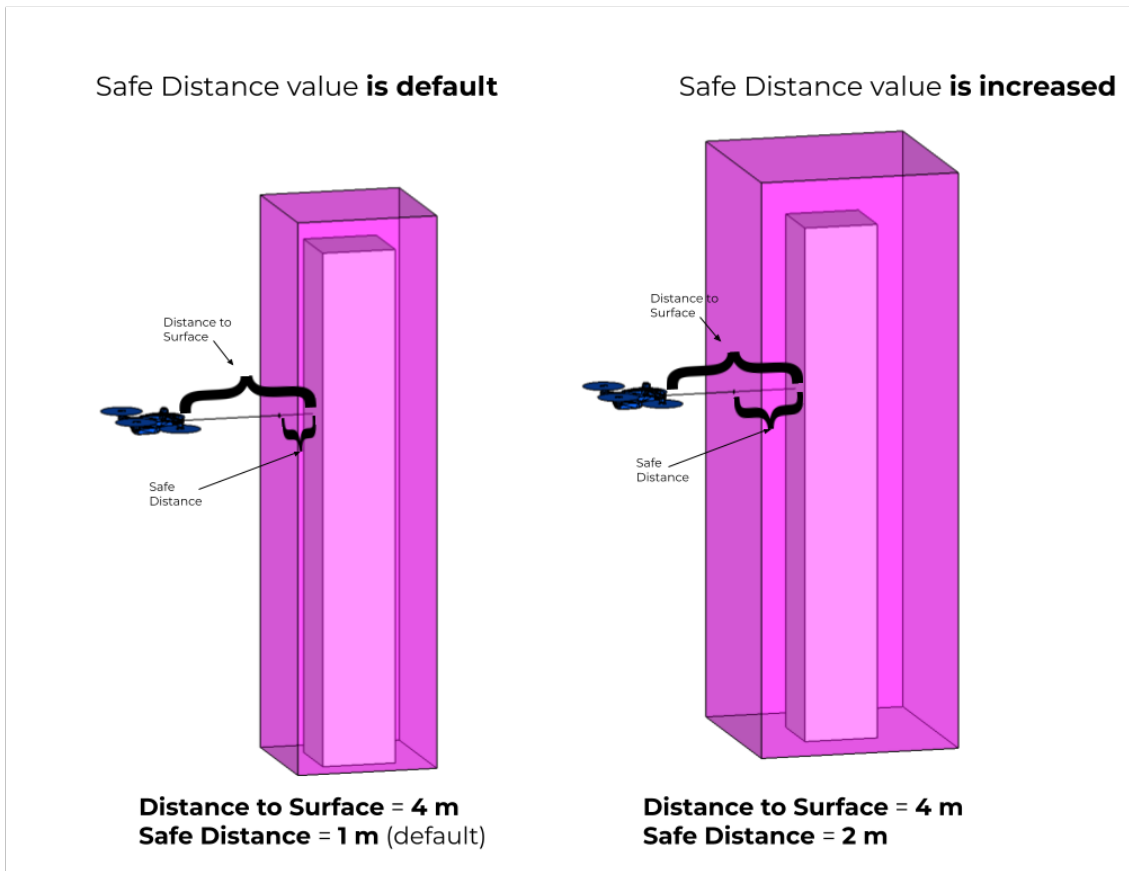


NOTE: Skydio 3D Scan uses Standard Obstacle Avoidance. Increase Safe Distance as an added safety measure to increase the distance Skydio stays away from obstacles. Enabling this setting may lead to gaps in coverage of some areas, such as concave surfaces. Ensure Take Best Photo is enabled to assist in capturing all surfaces.

SCAN SETTINGS / VISUAL GEOFENCE

The value you set for your **Safe Distance** is independent of **Distance to Surface** and should not be calculated as an addition to your Distance to Surface. The GSD will not be affected by increasing Safe Distance. See the below images for a visualization.

In these images, the pink region represents Safe Distance.



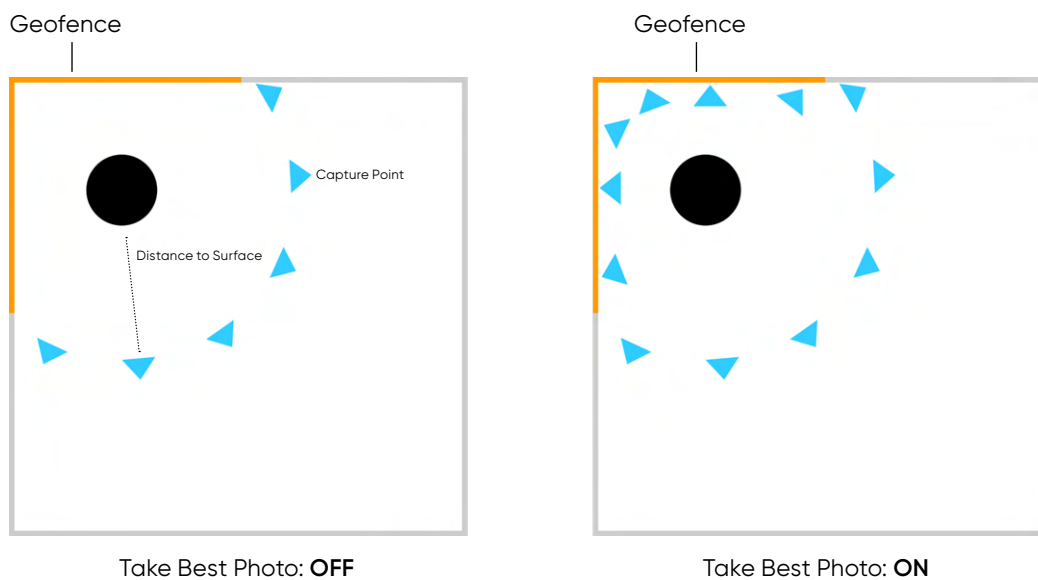
Take Best Photo

Skydio will intuitively adjust the Distance to Surface and image capture locations if it runs into obstructions at any point during the scan, allowing you to capture images in tight spaces. As the Distance to Surface is adjusted, the GSD will automatically update.



NOTE: This setting is **on** by default for all scan modes.

If Take Best Photo is toggled off, Skydio will skip capture points located outside of the yellow geofence (left photo). Take Best Photo allows Skydio to capture all surfaces of the structure you are scanning while safely avoiding collisions.



For example, imagine you are scanning a structure located next to a building:

- You have set your Distance to Surface to 50 feet.
- The building is 40 feet away from the structure you are scanning.
- With Take Best Photo enabled, Skydio will automatically adjust the Distance to Surface to a value less than 40 feet to ensure it captures images on the side of the structure closest to the building.
- Overlap and Sidelap will adjust for those photos captured.
- Use the AR Coverage Mesh during the Manual Capture step to ensure you have proper coverage across all surfaces.

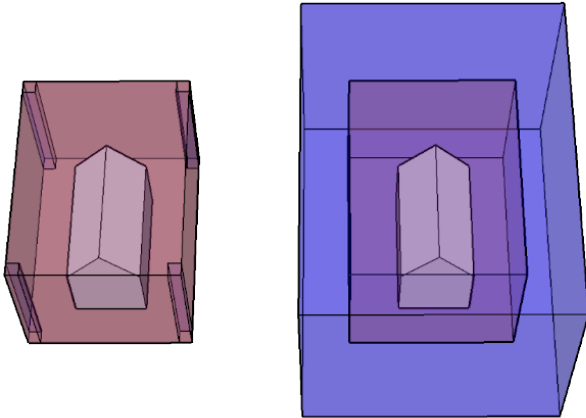


NOTE: Safe Distance will always be respected regardless of your other settings.

Modify Scan Volume

Modify Scan Volume expands the scan volume beyond the Floor, Ceiling or Walls.

Use the adjustable distance slider to set the distance at which Skydio will capture photos outside of the scan volume. Meaning, if you set the distance slider to 8 feet, extending one of the boundaries allows you to capture photos 8 feet outside of the scan volume.

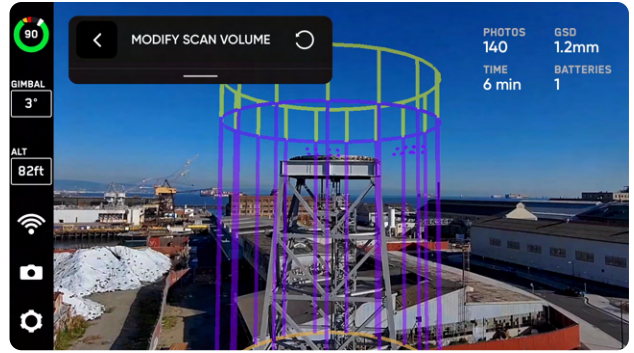


Geofence: **Strict**
Modify Scan Volume: **OFF**

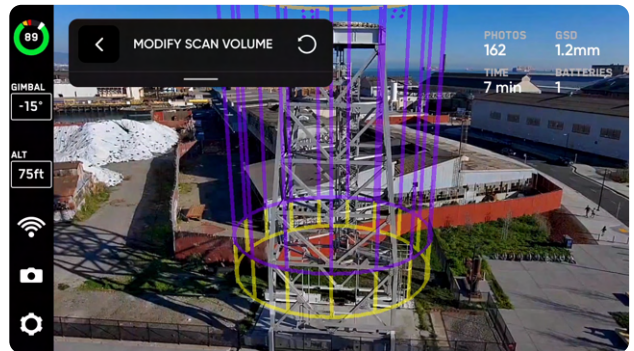
Geofence: **Strict**
Modify Scan Volume: **ON**

The maroon region represents the scan volume. When a Strict Geofence and Modify Scan Volume are enabled, Skydio will **not leave the Strict Geofence region** and will only face outward to capture images located in the Modify Scan Volume region.

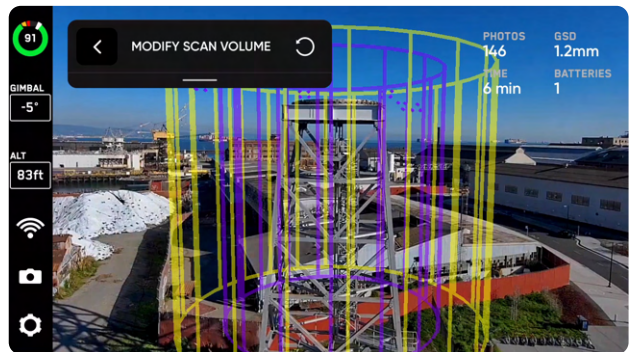
Modify Scan Volume is useful for indoor scanning or in situations where you need to capture the underside of a bridge.



Above Ceiling



Below Floor



Outside Walls



CAUTION: During a 3D Capture or a Tower Capture, Modify Scan Volume distance should not be larger than your Distance to Surface (DtS). If this happens and a Strict Geofence is enabled, no photos will be captured of objects that are located in the capture area beyond the DtS.

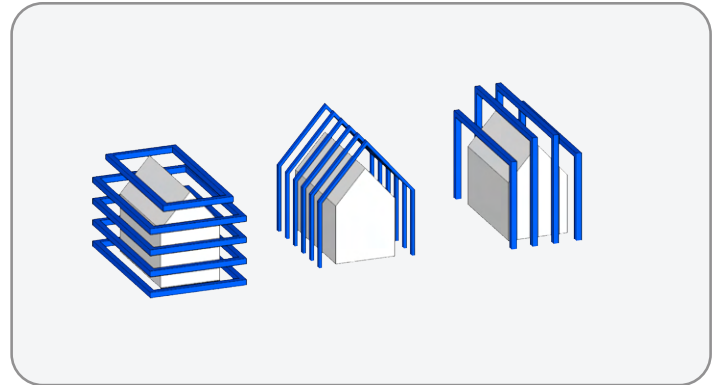
Optimize X,Y

Enabling this setting allows you to maintain full coverage while skipping redundant imagery that was captured in earlier scan passes during the X and Y passes. For example, if a certain capture point is covered during the Z pass, Skydio will intelligently skip this photo during the X and Y passes.

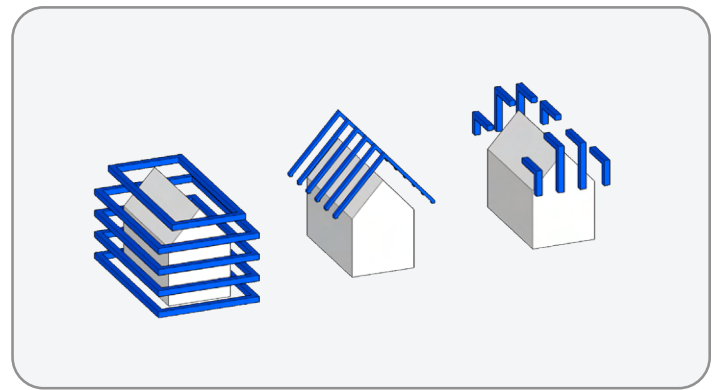
Optimize X,Y significantly improves efficiency of capturing images. Fewer images will be captured while maintaining full coverage, including unnecessary photos of the horizon and sky. Find this setting within the **Scan Passes** setting menu. View the areas that will be skipped by previewing the planned flight paths in the Review Settings step.

The bottom image shows "gaps" in the Y and X slices. These represent photos that were already captured during the Z scan pass, meaning Skydio will skip those points and only capture areas that have not yet been photographed.

Avoiding duplicate photos decreases the total scan time and total number of photos captured while maintaining full coverage.



Optimize X,Y: OFF



Optimize X,Y: ON

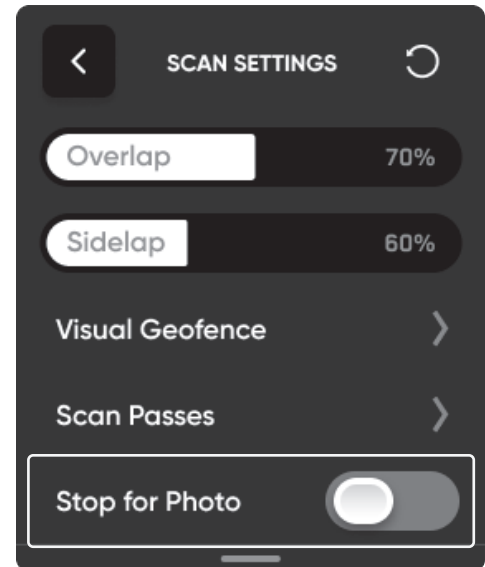


NOTE: X and/or Y scan passes must be enabled, along with Optimize X, Y to activate this setting.

Stop for Photo

By default, the drone will fly through image capture points without stopping for smooth and efficient flight. Skydio will automatically set the best speed to capture photos based on your scan distance and lighting conditions, while ensuring your images remain crisp and clear.

Toggle on **Stop for Photo** if you would like your drone to stop before capturing a photo at each capture point. The drone will still accelerate between capture points. Enabling this setting significantly increases the amount of time and batteries required to complete your scan.



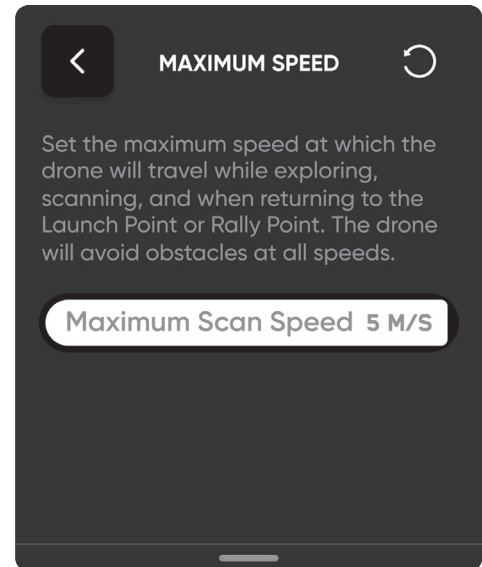
NOTE: DNG photos can only be captured when 'Stop for Photo' is enabled. If you enable DNG capture this will automatically toggle Stop for Photo.

Maximum Speed Slider

The Maximum Speed slider allows you to set the maximum speed at which Skydio will travel while exploring, scanning and when returning to the Launch Point or Rally Point.

While Skydio Obstacle Avoidance is robust, thin structures can be difficult to avoid. When scanning objects with cables or other thin or narrow features, try decreasing your speed with the Maximum Speed slider.

- Adjust this setting within the Explore settings or when reviewing the scan settings
- Speed options vary depending on your scan mode
- Skydio will avoid obstacles at all speeds. Per the limits of our obstacle avoidance capabilities, do not use 3D Scan when obstacles are less than 0.5" (1.27 cm) wide



Suggested Settings

Default settings are optimized for 3D reconstructions of 3D Captures, Tower Captures, or Indoor Captures.

If your main objective is to create a 3D reconstruction using a third party photogrammetry software, review the table below for example settings.

Example 3D Capture Settings for Reconstructions

INDUSTRY	USE CASE	OBJECTIVE	EXAMPLE GSD	SCAN PASS	OVERLAP/SIDELAP
Construction	Progress monitoring and asset inspection	Asset damage, misalignment, as-built vs. design	2 mm	Z, Y, X	80/70
Transportation	Bridge piers and vertical support structures	Cracks and delamination in concrete, bolts, nuts, connection points in weight bearing areas	1 mm	Z	80/70
Utilities	Distribution	Transformers, conductors, insulators, static wire, pole quality/damage	1 mm	Z	80/75
Telecommunications	Cell tower with complex antenna array	RAD Centers, connection points, access ladder conditions	1.5 mm	Z, Y or X	85/80 Thin lattice structures: 90/80



NOTE: Reference the **GSD at various fixed Distance to Surface** table within the 3D Capture Settings section.

If your objective is only to capture highly detailed imagery (without later processing), you can decrease the overlap and sidelap percentages (e.g. 30/30) to significantly speed up scan time.



TIP: For self support towers and other structures with thin structural members (e.g. lattice towers) we suggest increasing to 90% overlap. When necessary, fly further away as opposed to compromising overlap/sidelap.

Use Case Example: Key Requirements for Transmission & Distribution Inspection Images

DISTANCE TO SURFACE	Set to achieve up to 0.5 centimeter precision (GSD)
OVERLAP/SIDELAP	30%/30% overlap/sidelap from multiple angles of the tower infrastructure

2D and Map Capture Settings

Settings will persist between scans and between flights. If you would like to restore settings back to default, select the reset button in the top right on the workflow pane during the Review or Edit Settings steps of a scan.

Height

The most important setting for 2D Captures. Lower height means more photos taken and higher resolution, but an increased total scan time. In a 2D Capture, the Height is relative to the Surface you set. In a Map Capture, the Height is relative to the launch. The Height corresponds directly to Ground Sample Distance (GSD). Set the Height higher than the slider options by piloting the drone to your desired height and tapping the **Set Height to Current** button.

For tables that show GSD values at various fixed Distance to Surface, refer to the Distance to Surface section below.

GPS is required for scans higher than 65 ft (20 m).

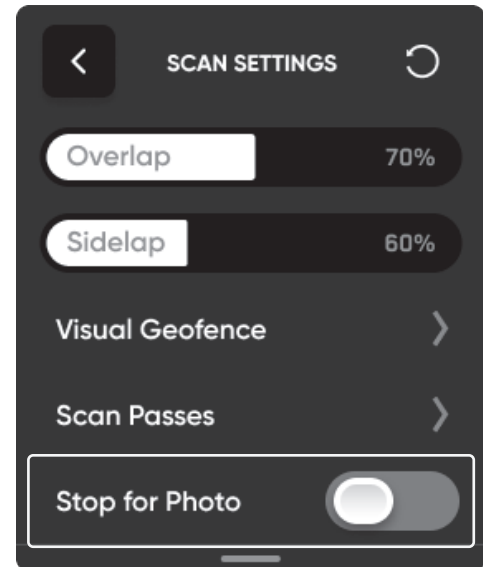
In order for Skydio to capture the underside of a structure, such as underneath a bridge, the underside of a parking garage or an interior roof, **you must enable the Upward Capture toggle in scan settings.**

- Pilot your drone below the scan Surface, then enable Upward Capture when reviewing scan settings
- This ensures Skydio will automatically move the camera gimbal pitch to look up when it detects the height of the drone is below the specified scan Surface

Stop for Photo

By default, the drone will fly through image capture points without stopping for smooth and efficient flight. Skydio will automatically set the best speed to capture photos based on your scan distance and lighting conditions, while ensuring your images remain crisp and clear.

Toggle on **Stop for Photo** if you would like your drone to stop before capturing a photo at each capture point. The drone will still accelerate between capture points. Enabling this setting significantly increases the amount of time and batteries required to complete your scan.



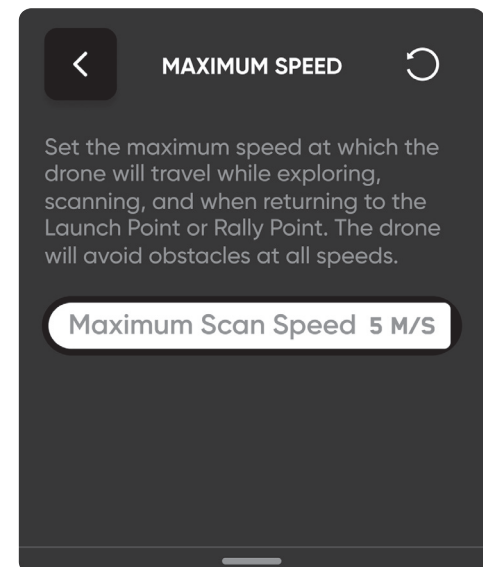
NOTE: DNG photos can only be captured when 'Stop for Photo' is enabled. If you enable DNG capture this will automatically toggle Stop for Photo.

Maximum Speed Slider

The Maximum Speed slider allows you to set the maximum speed at which Skydio will travel while exploring, scanning and when returning to the Launch Point or Rally Point.

While Skydio Obstacle Avoidance is robust, thin structures can be difficult to avoid. When scanning objects with cables or other thin or narrow features, try decreasing your speed with the Maximum Speed slider.

- Adjust this setting within the Explore settings or when reviewing the scan settings
- Set the speed between **1.1 mph (0.5 m/s) - 11.2 mph (5 m/s)**
- Default speed is **5.6 mph (2.5 m/s)**
- Skydio will avoid obstacles at all speeds. Per the limits of our obstacle avoidance capabilities, do not use 3D Scan when obstacles are less than 0.5" (1.27 cm) wide



Overlap Percentage

Overlap between photos along a path. Recommended default is 70% for complex scenes. For an example use case, review the **Suggested 2D Capture Settings**.

Sidelap Percentage

Sidelap between paths. Recommended default is 70% for complex scenes. For an example use case, review the **Suggested 2D Capture Settings**.

Cross Hatch

Capture oblique images by enabling the Cross Hatch setting. When enabled, Skydio will capture in a rotating lawn mower pattern. This increases the number of photos but provides better oblique imagery for reconstruction. Instead of capturing top-down (nadir), the camera gimbal angle is adjustable to capture images at an angle for more detailed reconstruction. The camera gimbal angle is set to 60° by default.

When disabled, the drone will capture photos in a nadir (top-down) lawn mower pattern.



The camera gimbal pitch represents the angle below the horizon.

Perimeter

Scan 3D volumes by traversing the 2D perimeter at multiple heights and taking pictures inward. This will take place at the end of the scan, and the additional inward photos will improve reconstruction. This is a good setting to enable when scanning vertical structures like tall buildings or towers.

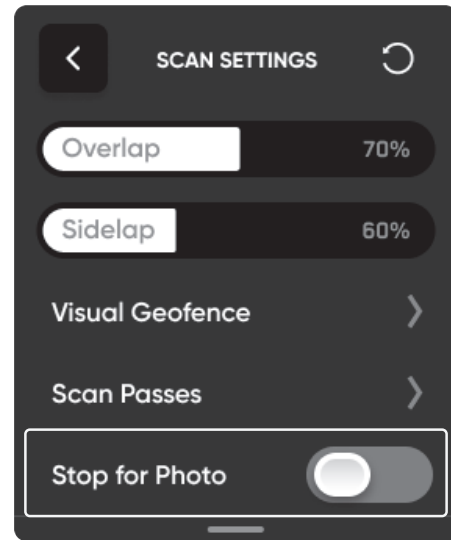
Adjust the Gimbal Angle slider to your desired camera angle.

Stop for Photo

By default, the drone will fly through image capture points without stopping for smooth and efficient flight. Skydio will automatically set the best speed to capture photos based on your scan distance and lighting conditions, while ensuring your images remain crisp and clear.

- 2 m distance = 0.3 m/s photo speed
- 4 m distance = 0.56 m/s photo speed
- 8 m distance = 1.12 m/s photo speed

Toggle on **Stop for photo** if you would like Skydio to stop before capturing a photo at each capture point. The drone will still accelerate between capture points. Enabling this setting significantly increases the amount of time and batteries required to complete your scan.



NOTE: DNG photos can only be captured when 'Stop for Photo' is enabled. If you enable DNG capture this will automatically toggle Stop for Photo.

Suggested Settings

Default settings are optimized for 2D orthomosaic generation in 2D Capture. Your GSD will adjust based on your altitude settings. Higher overlap and sidelap percentages result in longer scans and a greater number of photos. You have the ability to adjust these settings before the scan begins.



NOTE: If your goal is to create a high fidelity reconstruction, increase your overlap and sidelap percentages. If you do not plan to create a model of your scan, lower overlap and sidelap percentages will suffice.

Use a 2D Capture when you wish to scan:

- Areas that can be scanned in one battery or less
- Areas at heights closer to the ground, e.g. < 65 ft
- Areas that are not represented on the basemap because the GPS satellite/map data is out of date, or missing entirely
- Smaller areas such as roadways, small buildings or construction sites, where GPS satellite/maps are not high enough resolution for accurate flight planning
- Areas without connectivity where you may not have been able to download maps in advance
- Areas that may be more complicated than basic polygons, such as intersections where trees may be encroaching
- Areas that are indoors or in particularly challenging environments where GPS is not reliable or not available
- Areas where the Floor height is above ground level (i.e. scanning a roof)

Use a Map Capture when you wish to scan:

- Areas that require more than one battery to scan, where preplanning before launch is significantly faster than planning via AR pillars
- Large areas that you wish to scan at greater heights above ground, e.g. > 65 ft
- Large areas that are well represented on GPS satellite/basemaps
- Large areas that you may scan repeatedly

SUGGESTED SETTINGS / 2D CAPTURE AND MAP CAPTURE

Example 2D Capture Settings

INDUSTRY	USE CASE	OBJECTIVE	EXAMPLE GSD	CROSS HATCH OR PERIMETER	OVERLAP/SIDELAP
Construction	Site survey, stockpile volumetrics	Site progress, volumetrics, terrain model	10 mm	Cross hatch	75/70
First responder	Large collision scene reconstruction	Crumple damage, skid marks, weapons, broken glass	1 mm	Cross hatch	80/75
Transportation	Bridge deck, bottom surface	Cracks and delamination in concrete, road damage, erosion, site survey, terrain model	10 mm	Cross hatch *Enable Upward Capture	70/70



NOTE: Reference the **GSD at various fixed Heights** table within the **Distance to Surface** section below.

Distance to Surface

The following tables represent GSD values for **3D Capture**, **Tower Capture**, and **Indoor Capture** modes.

The Distance to Surface corresponds directly to Ground Sample Distance (GSD) which defines the distance between two consecutive pixel centers on the ground. For example, a one-millimeter GSD would suggest that the distance of the two consecutive pixel centers in the photo reflects one millimeter on the ground.

Skydio 2/2+ and Skydio X2 Color GSD at Various Fixed Distance to Surface

DISTANCE TO SURFACE (M)	DISTANCE TO SURFACE (FT)	GSD (MM)
1.5	4.92	0.63
2	6.56	0.84
2.5	8.20	1.05
3	9.84	1.26
3.5	11.48	1.47
4	13.12	1.68
4.5	14.76	1.90
5	16.40	2.11
5.5	18.04	2.32
6	19.69	2.53
6.5	21.33	2.74
7	22.97	2.95
7.5	24.61	3.16
8	26.25	3.37

DISTANCE TO SURFACE / 3D CAPTURE, TOWER CAPTURE, INDOOR CAPTURE

Skydio X2 Color/Thermal GSD at Various Fixed Distance to Surface

DISTANCE TO SURFACE (M)	DISTANCE TO SURFACE (FT)	GSD (MM)
4	13.12	0.83
5	16.40	1.04
6	19.69	1.24
7	22.97	1.45
8	26.25	1.66
9	29.53	1.87
10	32.81	2.07
11	36.09	2.28
12	39.37	2.49
13	42.65	2.70
14	45.93	2.90
15	49.21	3.11

DISTANCE TO SURFACE / 2D CAPTURE, MAP CAPTURE

The following tables represent GSD values for **2D Capture** and **Map Capture** modes.

Skydio 2/2+ and Skydio X2 Color GSD at Various Fixed Distance to Surface

HEIGHT (FT)	HEIGHT (M)	GSD (MM)
5	1.5	0.632
8	2.4	1.011
12	3.7	1.558
15	4.6	1.938
20	6.1	2.568
30	9.1	3.851
40	12.2	5.135
50	15.2	6.419
75	22.86	9.629
100	30.5	12.838

DISTANCE TO SURFACE / 2D CAPTURE, MAP CAPTURE

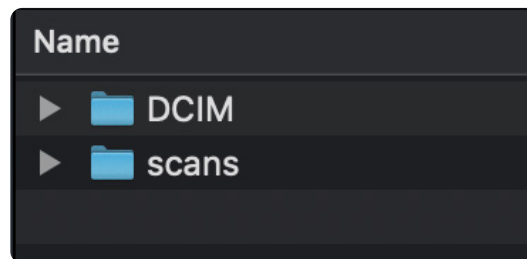
Skydio X2 Color/Thermal GSD at Various Fixed Distance to Surface

HEIGHT (FT)	HEIGHT (M)	GSD (MM)
10	3	0.632
16	4.8	1.011
24	7.4	1.558
30	9.2	1.938
40	12.2	2.568
60	18.2	3.851
80	24.4	5.135
100	30.4	6.419
150	45.72	9.629
200	61	12.838

Accessing Scan Data

Retrieve valuable contextual data about scans after your flight. To access the photos off of your device, you must remove the microSD card from your drone. Use any **microSD or SD card reader** to view and copy your full-resolution photos to your personal computer.

There are two different folders on your Media Card:

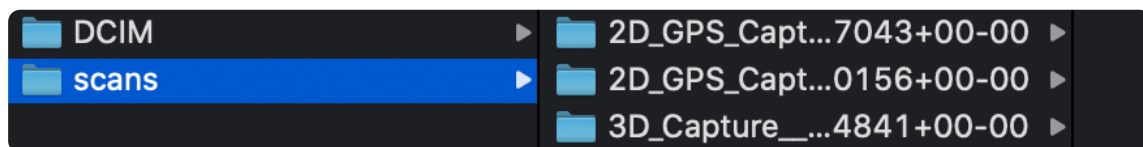


Digital Camera Images (DCIM) Folder

The DCIM folder holds a subfolder titled **100SKYDO** which houses low-resolution video files (.LRV) of your scan. You will not need these files to create 3D reconstructions.

Scans

Locate your individual scans within this folder. Folders are titled by scan name followed by a UTC timestamp. For example, 3D_Capture__2021-05-20T19-50-55.135854+00-00.



Scan directories only support American Standard Code for Information Interchange (ASCII) characters. Spaces, Unicode characters such as à, é, â, ü, ö, ä and the following symbols will be converted to underscores (_) in the scan directory name: < > ; \ | / ? * & \$ { } ` ' " **Do not rename scan directories.** Visit <https://skydio.com/support> for more information.

After selecting the scans folder, you will see a few different types of files inside.

Photo Files

There are two different photo file extensions you can use in 3D Scan™.

Joint Photographic Experts Group (.JPG)

A JPG file is a digital image format containing compressed image data. **These are the images you captured during your scan.** You will need these files for creating reconstructions in photogrammetry software programs.

Digital Negative (.DNG)

A DNG file is a RAW image format file, meaning it is not compressed and retains all original photo data. A DNG file is larger than a JPG file since it stores image data. If you enabled DNG capture during your scan, you will need these files for creating reconstructions in photogrammetry software programs.



NOTE: DNG photos are not displayed in the media tab of the Skydio Enterprise app or Skydio Cloud and may be retrieved directly from the microSD card.

Scan Files

Capture_Report.html

Includes a report with the summary of your scan details. Click this to view a webpage that outlines the following information:

- Scan ID
- Time and date
- GPS location
- Scan setting details (scan mode, overlap, sidelap, scan passes etc.)
- Scan area
- Number of pillars set
- Number of batteries used
- Total flights and flight time
- Total number of images (captured manually and autonomously)



TIP: Save this webpage as a PDF for further team collaboration and to easily refer back to the settings you used during a specific scan.

3D Capture
Skydio

Scan generated at 01:27 PM on September 02, 2021

Summary

Description: No description

Scan ID: 841527a924d40778cc31743e6d7d8ba

Started: 01:11 PM on September 02, 2021

GPS Location: (37.76191181, -122.38712884)

Settings

Scan Mode: 3D Capture

Stop Vehicle at Photo: Disabled

Take HDR Photos: Enabled

Distance to Surface: 20 ft

Overlap: 80%

Sidelap: 70%

Visual Geofence

Strict Ceiling	Strict Floor	Strict Lateral
Disabled	Enabled	Disabled

Scan Passes

Z	Y	X
Enabled	Enabled	Enabled

Stats

Scan Area: 1626.18 sq ft

Pillars: 7

Flights: 1

Batteries: 1

Flight Time: 13 minutes

GSD: 0.099 in

Images

Total	Autonomous	Manual
185	178	7

Flights

Flight	Flight ID	Takeoff Time	Images	Vehicle Model	Vehicle Name	Vehicle ID
1	80DD744425E4E2AA0601BFA49A12304	2021-09-02 01:11 PM	185	Skydio 2	Skydio2-2f9c	121912092984748

Coverage_within_params.gltf

A standard file format for 3D models. This is the model shown in the Edge Model Viewer.

Pix4D_geolocation.csv

A file that includes metadata specifically for use in PIX4DMapper.

Scan_output.pbuf

This file contains serialized metadata about your scans. You will not need this to create 3D reconstructions, but it is used to enable the Edge Model Viewer. **Do not delete this file.**

3D Reconstructions

You must use a third party provider such as DroneDeploy or Bentley to create 3D models of your scans.

To create a 3D model, save the JPG files from the scan onto your personal computer. For details on how to access your photos through Skydio Cloud visit <https://skydio.com/support>.

Next, upload these files to your preferred photogrammetry software program to create your model.

To locate the JPG images of your scan, follow these steps:

1. Place your Media Card in any microSD or SD card reader and insert into your personal computer.
2. Locate the card reader in your files.
3. You'll see two folders, DCIM and scans. Open scans.
4. Each folder is a different scan. Locate the scan you wish to reconstruct.



NOTE: Folder titles include the scan name followed by a UTC timestamp. For example: scans/Scan_Name__2021-06-02T19-50-55..135854+00-00

Check out our article, [How to create 3D reconstructions](#) for more detailed information.

Recommendations for 2D Upward Capture DroneDeploy reconstructions

To process a successful 3D model of a 2D Upward Capture, ensure you select **Vertical Model**

1. Create or open a project in DroneDeploy
2. Set the scan location on the map
3. Select the **Upload** tab located at the top of the screen
4. Select **New Upload**
5. Select **Vertical Model**
6. Upload your scan photos

The screenshot shows a vertical list of options for processing a scan. The 'Vertical Model' option is highlighted with a blue border. Each option includes an icon and a brief description.

- Map or Model**: Add images to create maps and models
- Vertical Model**: Add images to create a facade model of a structure
- Photo Report**: Add photos for inspecting and sharing progress
- Video**: Add video to show and share footage of the site
- Panorama**: Add images to create a panorama of a location
- 360 Walkthrough**: [Contact us](#) to enable 360 virtual walkthroughs on your site.

Lost Connection, Low Battery & Environmental Factors

Lost Connection

If Skydio loses connection to the Skydio Controller or mobile device during a scan, it will continue scanning for about one minute.

If it is unable to reconnect, the drone will move through a series of steps:

1. After waiting 60 seconds, the drone will first return to the **scan starting point**.
2. If it still doesn't reconnect in the next 30 seconds, the drone will return to the **Rally Point**.
3. If it still doesn't reconnect after another 30 seconds, the drone will return to the **Launch Point**.

The drone will then hover at the Launch Point until it reconnects. If it does not reconnect, **the drone will eventually run out of battery and auto-land**.

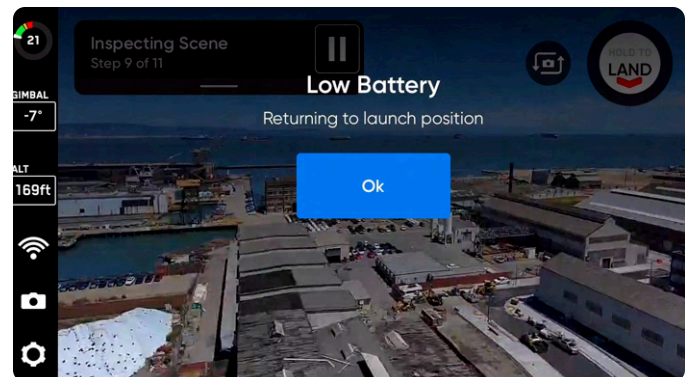
Low Battery

When the drone reaches a low battery level (about 3 minutes of flight time remaining), it will automatically return to the Rally Point. If no Rally Point is set, your drone will automatically return to the Launch Point.

You will then be prompted to land. If the battery reaches a critical level the drone will auto-land.

You may pause this autonomous action at any point using the left shoulder button on your Controller.

If you are manually piloting the drone when it reaches a low battery level, Skydio will land in place.

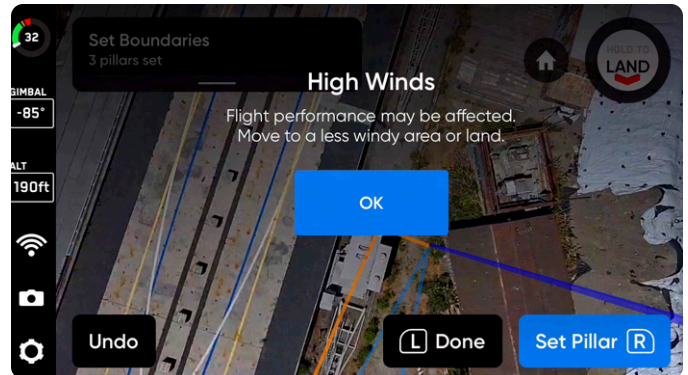


Environmental Factors

Skydio 2/2+ should not be flown in temperatures below 23°F (-5°C) or above 104°F (40°C). Skydio X2 should not be flown in temperatures below 14°F (-10C) or above 109°F (43°C). Do not let your drone sit in direct sunlight when on the ground or when processing post-flight tasks.

If it is too hot or too windy, the drone will return to the scan start point. You then have the option to take over and pilot the drone home.

Based on the available lighting conditions, Skydio will automatically adjust photo settings to ensure it captures the best quality images. You will see in-app notifications alerting you if there are problems with the lighting conditions. The drone will continue flying for 20 seconds, and if conditions do not clear then it will return to the Rally Point.



Tips & Best Practices

- Do not remove or swap out the Logs Card between flights of the same scan. Removing either card when replacing a depleted battery will result in your drone being unable to resume the scan.
- Keep your drone and app up-to-date. Visit our support site for update instructions.
- Do not let your drone sit in direct sunlight for extended periods of time and use caution when flying in hot or cold temperatures.
- **If you are flying using DroneDeploy then you must exit 3D Scan to regain access to Flight Skills.** To exit, first land the drone. Navigate back to the Device Settings Menu and change the Vehicle Mode to Skills.
- GPS will be required for scans higher than 65 ft (20 m).
- Ensure there is enough space on both your Media Card and your Logs Card before starting a 3D Scan.

