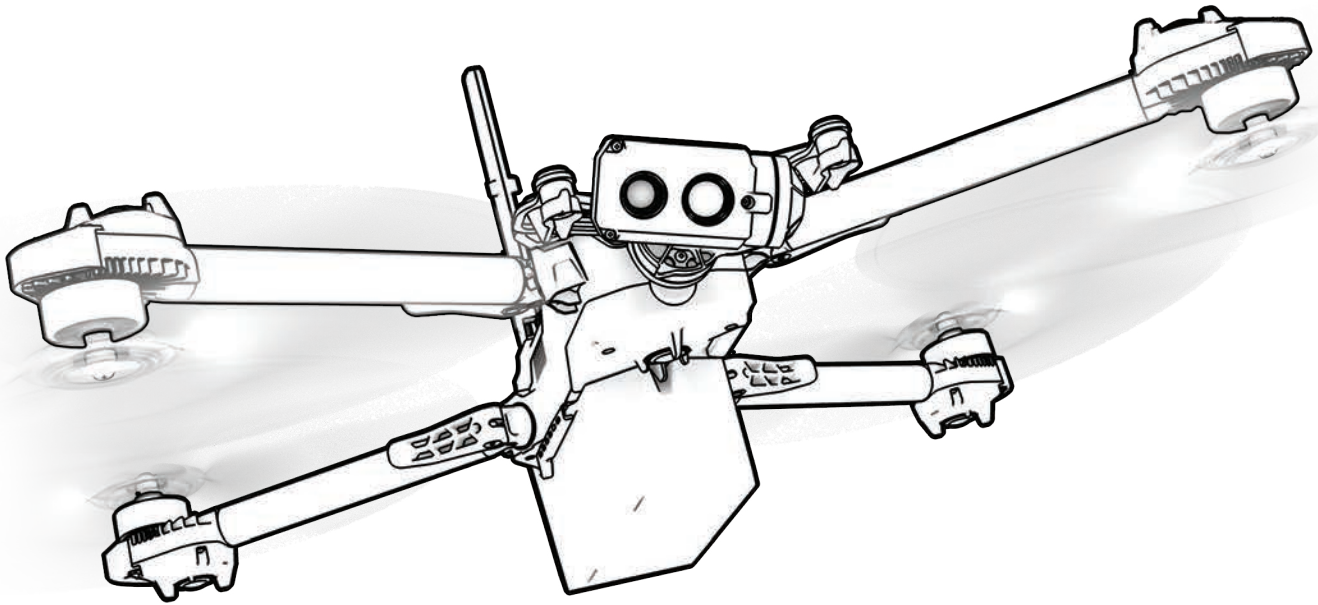# Skydio

Operator Manual
Skydio X2D INTL

⚠️ **WARNING:** *Please read all documentation provided with your Skydio X2D. For additional safety and operating resources and information visit: Skydio.com/support*

Effective date: **March 20, 2023**

Vehicle version: **21.3.87**

Enterprise Controller version: **21.3.36**

Document version: **1.3**

Change Log

Revision	Date	Page	Description
1.0	25-JUL-2023	All	Initial software release 21.3.87
1.1	16-AUG-2023	20	Changed the encryption note to a warning and amended the statement to: provisioning the security key pairs that particular key to the drone. In an effort to maintain secure media Skydio does not support encryption using an alternate key. It is important to store the provisioned key with the drone.
1.2	1-SEP-2023	1	Added identifying number labels that were missing Changed USB-C cable → USB-C pairing cable Changed X2D Propeller Kit CW (6) CCW (6) screws (12) → even dot pattern props (6) odd dot pattern props (6) and screws (12) Changed # 17 Security key → Encryption fob
1.2	1-SEP-2023	5	Changed button mapping copy *Programmable: Step 1 - Select the Device settings menu, Step 2 - Select the Controller tab, Step 3 - Select Button Mapping
1.2	1-SEP-2023	8	Added info to the Flying over water section of the safety section. *Skydio recommends a satellite count of at least 20 when flying over water.*
1.2	1-SEP-2023	17	Updated copy for clarity.
1.2	1-SEP-2023	18	Updated copy and added section for 1.8 GHz channel and bandwidth selection. Fixed typo 3.3 ft to 33 ft. Due to GPS interference vehicle altitude is limited to 33 ft (10 m) above launch (AGL).
1.2	1-SEP-2023	20	Updated copy for clarity and replaced security key with encryption fob
1.2	1-SEP-2023	21	Updated copy on step 4 to read: *Select Encryption the selection is persistent across flights and power cycles.*
1.2	1-SEP-2023	22	Updated copy for clarity, UI images, and note to include satellite count.
1.2	1-SEP-2023	24	Added Low battery return details and updated UI image.
1.2	1-SEP-2023	25	Rearranged the order of the settings on the page.
1.2	1-SEP-2023	26	Updated default flight speeds and UI image.
1.2	1-SEP-2023	27	Updated button mapping and coordinates copy for more concise information. Added a screenshot of the button mapping UI. Deleted touch gesture info as it is also on page 32.
1.2	1-SEP-2023	28	Updated copy to include more information about the thermal region of interest and the AGC tuning.
1.2	1-SEP-2023	35	Updated the warning to read hand launch and landing may cause server injury if not performed properly and should only be used when necessary. Updated copy Step 6 - As the propellers begin to spin up slowly relax your grip. Keep your hand still and level.
1.2	1-SEP-2023	45	Updated the copy and images for clarity.
1.2	1-SEP-2023	52	Updated copy on step 7 added X2D will climb to 10 ft while rotating 360° to establish a heading. Added and oscillate up and down to the warning.
1.2	1-SEP-2023	53	Removed the note NOTE: The multi-step calibration may not be required for several weeks or even months, depending on the environment. You will be prompted when another calibration is necessary.

Change Log continued

Revision	Date	Page	Description
1.2	1-SEP-2023	60	Replaced security key with encryption fob
1.2	1-SEP-2023	66	Step 7 - updated copy to say Repeat steps 1-6 on the remaining arms
1.2	1-SEP-2023	68	Deleted copy in Step 2 *and set aside - you will reuse it.* New screws are contained in the repair kit
1.2	1-SEP-2023	72	Deleted *NOTE: The torque value should be approximately 6 cNm*
1.2	1-SEP-2023	80	Deleted the word controllable in the pitch range
1.3	11-SEP-2023	36	Updated telemetry info
1.3	11-SEP-2023	37	Moved Connection Status from page 36 to page 37
1.3	11-SEP-2023	42	Moved PIP info to page 42 for space and clarity

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Post-flight

Emergency Behaviors

Maintenance

Troubleshooting

Specifications

Legal

Overview

Skydio X2D and Accessories
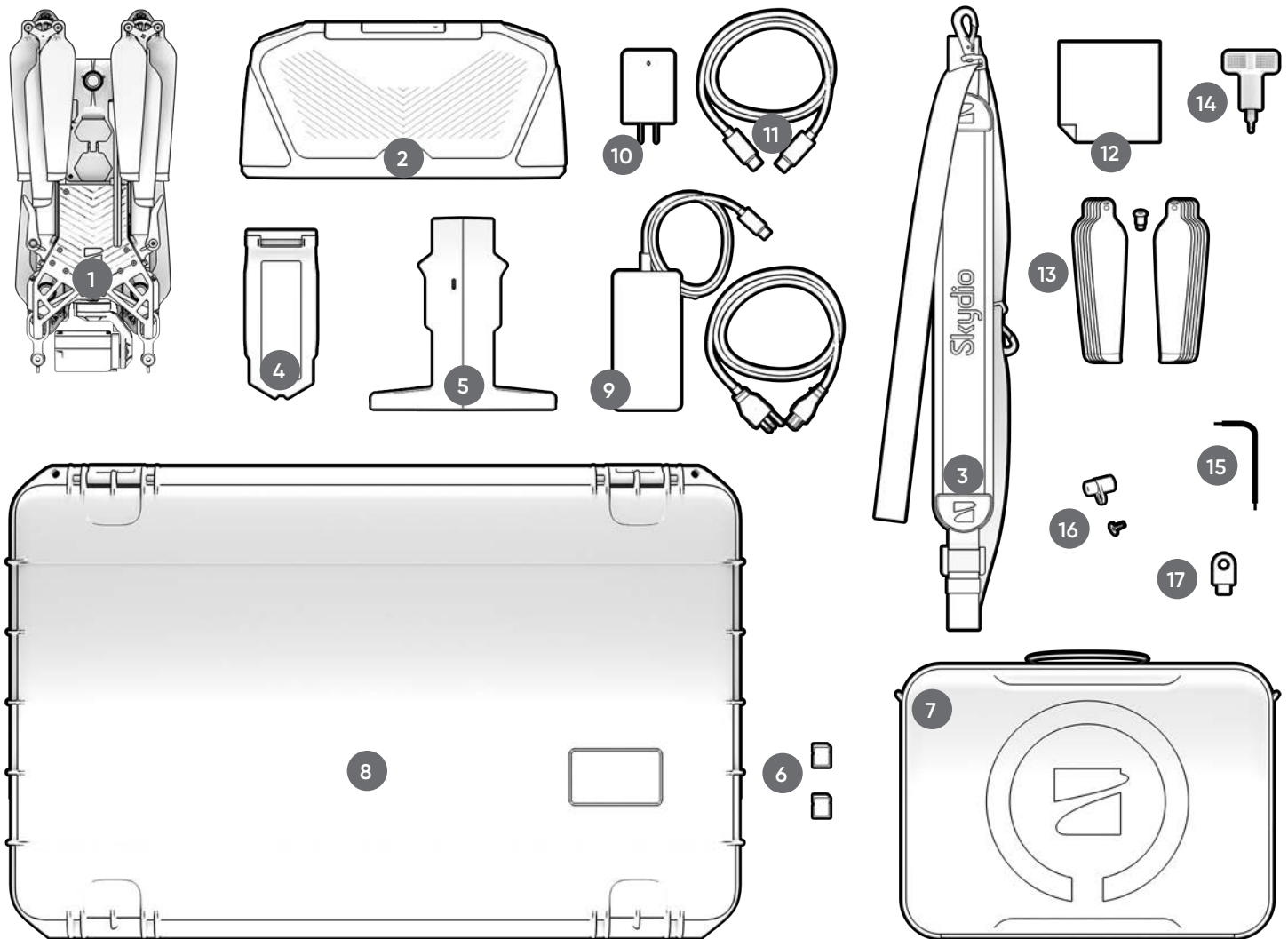
1. Skydio X2D drone
2. Skydio Enterprise Controller
3. Controller neck strap and bracket
4. Battery
5. Dual Charger
6. 256GB SD cards (pre-installed)
7. Tactical soft case
8. Admin hard shell case
9. 100 W adapter and cable
10. 65 W Adapter
11. USB-C cable
12. Microfiber cloth
13. X2D Propeller Kit
    - even dot pattern props (6)
    - odd dot pattern props (6)
    - prop screws (12)
14. Torque driver
15. T3 driver
16. Hard stops and screws
17. Encryption Fob

Also needed - USB-C flash drive to:

- install software updates
- transfer offline maps
- export flight logs

Skydio recommends 8 GB (or more) Scandisk Ultra Dual Drive USB Type-C

- format drive file system to ExFat

Overview

Skydio Hardware

1. Chassis
2. Navigation camera (6)
3. Gimbal
4. Motor pod (4)
   RGB/IR/Strobe navigation lights
5. Propeller hub
6. Propeller blades
   clockwise (6) counter-clockwise (6)
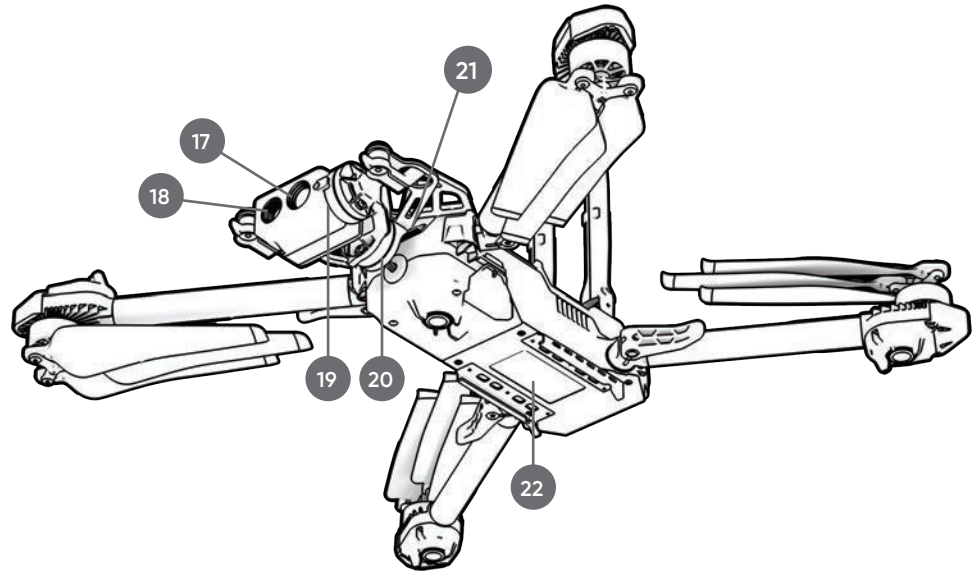7. Arm (4)
8. Arm clamp (4)
9. Antenna(s)
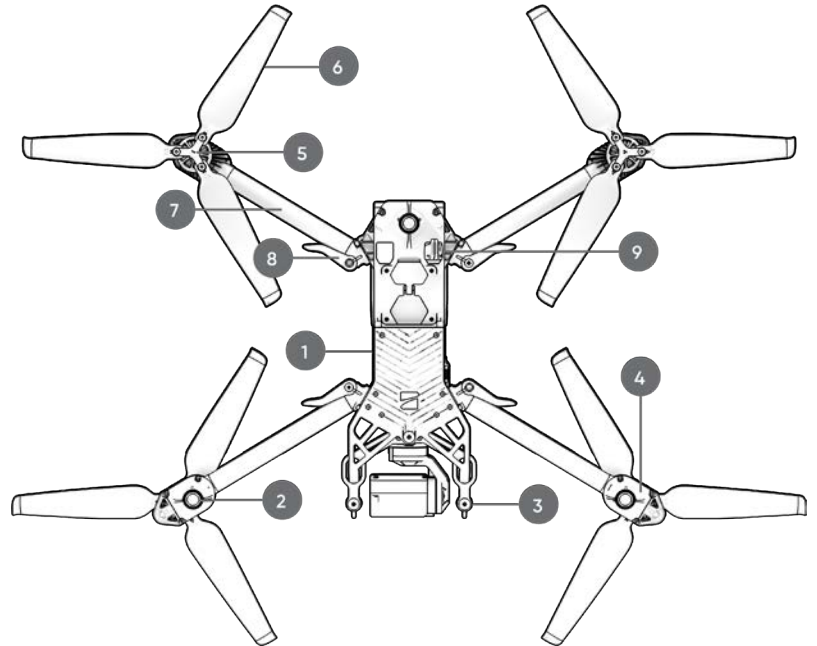
10. microSD card ports & seal
11. USB-C port & seal
12. Cooling outlet (2)
    do not cover
13. Hard stop (4)
14. Battery
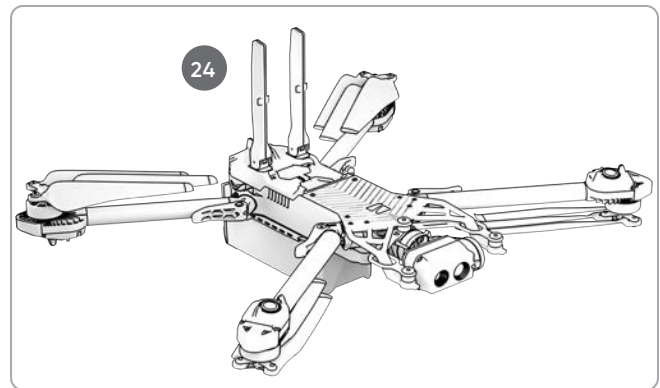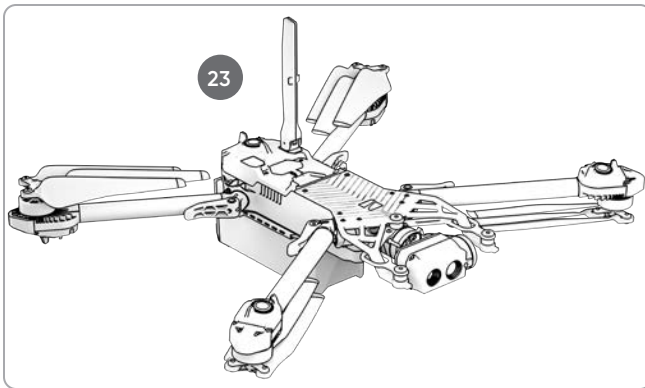15. Gimbal isolator (3)
16. Power button
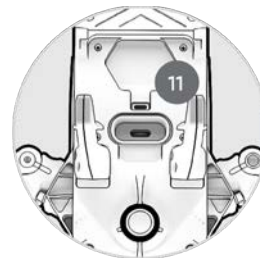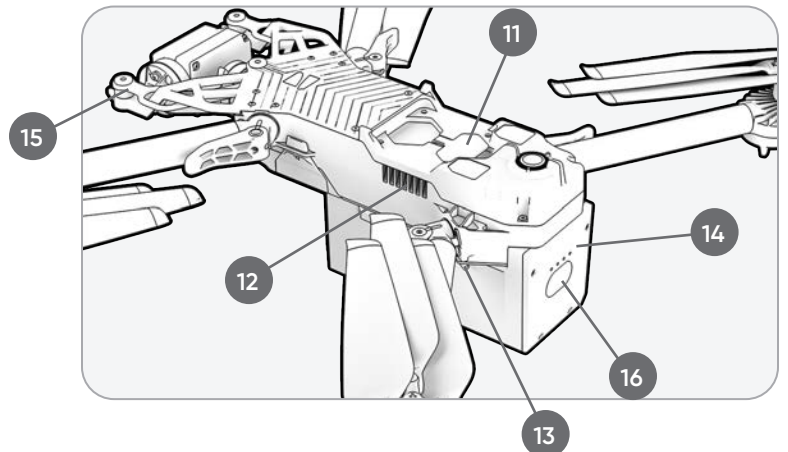
Overview

Skydio Hardware

17. Color EO camera

18. Thermal IR camera

19. Gimbal pitch motor

20. Gimbal roll motor

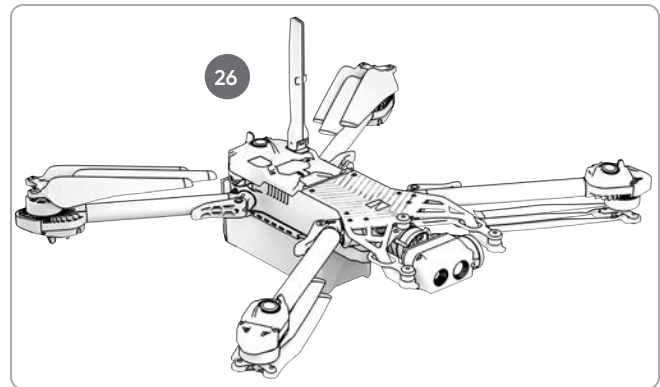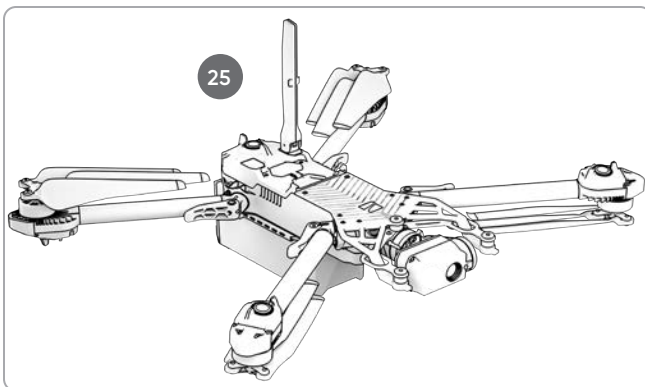**21.** Cooling inlet

22. Skydio X2D label

Radio frequency variations

23. one-antenna: 1.8 GHz and Multiband

24. two-antennas: 5 GHz

Camera variations

25. Color Electro-Optical Camera only

**26.** Color Electro-Optical and Thermal Infrared Camera

Overview

Payload Bay

The Skydio X2D payload bay interface is located on the top of the drone and consists of an indented area with recessed USB Type-C electrical interface receptacle, weatherproof cover, and 4 recessed mounting nuts. The payload bay is designed to accommodate third-party payloads with the following limitations:

- size not to exceed dimensions: 1.75"(L) X 1"(H) X 2"(W)
- weight not exceed: 200 grams
- power not to exceed: 15 Watts
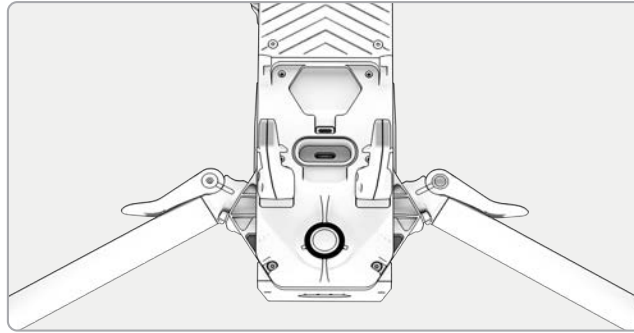
> 📝 **NOTE:** *Powering the vehicle from a payload is not supported*

Payloads should be securely mounted to the X2D with no dangling parts or wires. Payload mass should be roughly evenly distributed, and stay within the payload bay area. Loose parts or wires may cause propeller strikes or obstruct the navigation system resulting in loss of flight control.

Flight Limitations

Line of sight - payloads that obstruct the field of view of the navigation system may result in failure to take off, erratic flight, crashes, and fly-aways.

Flight time - any payload added to the vehicle will decrease the flight time. The closer the weight gets to 200 grams the shorter the flight time will be.

Range - payloads that obstruct the antenna may cause degraded range, sudden loss of connection, slow or unresponsive controls.

Signal - payloads that emit a wireless signal may cause degraded range, sudden loss of connection, slow or unresponsive controls.

GPS antenna - payloads may interfere with the GPS antenna resulting in poor GPS positioning, and affect features such as Waypoints, GPS Night Flight and Height Ceiling.

Altitude - added weight and lower air density may result in slow or unresponsive flight controls. High altitude flight with a payload is not recommended.

> ⚠️ **WARNING:** *Third-party payloads may result in degraded flight time, wireless range, altitude, GPS performance, and general flight performance*

Overview

Skydio Enterprise Controller

1. Left joystick
2. Right joystick
3. Menu/back button
4. D-pad
5. C1 button - obstacle avoidance
6. C2 button - toggle lights on/off
7. Return to Home button
8. Power button
9. Launch/Land button
10. Pause button
11. Controller clamshell
12. User interface screen
13. Reset button
14. Reset button (alternate)
15. R1 button shutter/record
16. L1 button boost
17. Right wheel zoom*
18. Left wheel gimbal tilt*
19. R2 button toggle map*
20. L2 button toggle thermal to color*
21. USB-C port
22. Cooling fan
23. Neck-strap and tripod (¼-20) mount
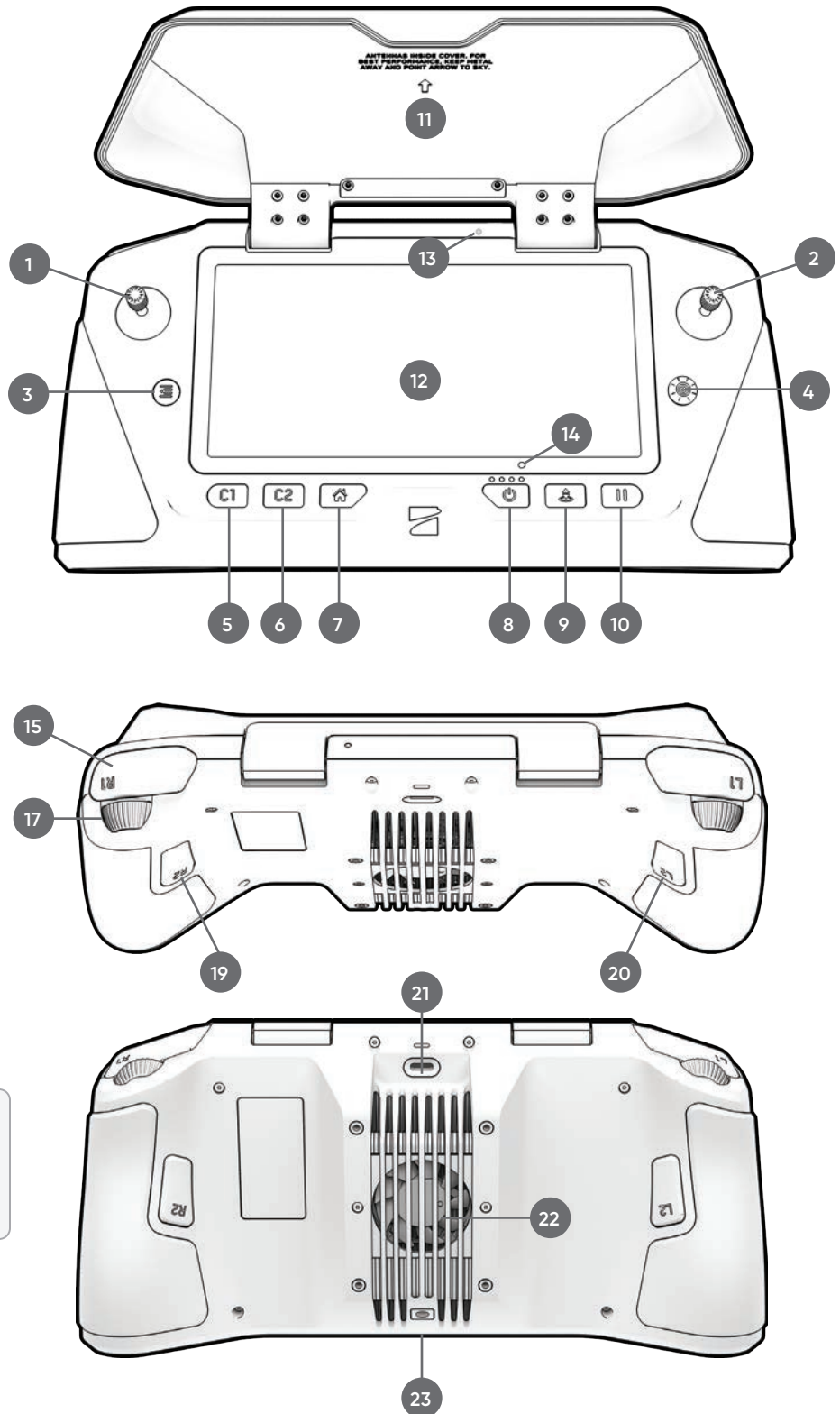
* Programmable:
Step 1 - Select the **Device settings** menu
Step 2 - Select the **Controller** tab
Step 3 - Select **Button Mapping**

> ⚠️ **CAUTION:** *Skydio Enterprise Controller is not weatherproof. Do not operate in any precipitation, including rain, fog, snow, or similar environments. Do not rest the controller in sand, dirt or on similar terrain where particles can get trapped in the fan. Do not use batteries if the magnets or connector pins are damaged.*

Overview

Skydio Autonomy Enterprise

| FEATURE	DESCRIPTION	MAIN USE CASES	KEY BENEFITS
CLOSE PROXIMITY OBSTACLE AVOIDANCE	The drone can fly closer to obstacles. Close (~11", 28 cm) Minimal (~4", 10 cm) Disabled Standard (~34", 86 cm) (out-of-the-box with X2D)	• Situational awareness • Inspection	Allows closer flight for indoor navigation e.g. through large doorways and up-close inspection of detailed assets
VISUAL RETURN-TO-HOME	Ability to RTH purely using visual wayfinding when flying in GPS denied environments	• Situational awareness • Inspection	Provides robust and safe RTH in high-RF or GPS-denied environments (e.g below bridges)
SUPERZOOM	Blends the six 4K navigation cameras to create an omni-directional view. Allows the user to zoom digitally with algorithmic image stabilization	• Situational awareness	See farther, and in all directions without moving the drone - reduces pilot cognitive load
ORBIT POINT	Drone will navigate itself while revolving around a user-defined point on a map	• Situational awareness	Enables surveillance and overwatch of any structure or locale
TRACK-IN-PLACE	Ability to visually track a car or person from a fixed position from farther away	• Situational awareness	Enables covert surveillance from farther standoff distances
VERTICAL VIEW	Gimbal can vertically look straight up above the drone	• Inspection	Allows for overhung inspections such as ceilings, bridges, and canopies

Safety

Safety Guidelines

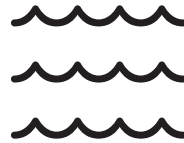Keep your fingers away from moving propellers at all times.

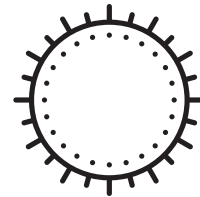Use caution around thin branches, utility lines, ropes, wires, netting, chain link fencing, etc.
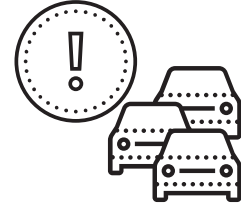
Skydio X2D does not avoid moving objects or cars.

Skydio X2D is not weatherproof – don't fly in rain, snow, fog, high winds, etc.

Fly cautiously over bodies of water more than 30ft (9.1m) across.

Skydio X2D obstacle avoidance is off during GPS Night Flight mode and can be impaired when in low light & poor visibility. Fly with **extreme caution** under these conditions.

Clean all of the cameras so Skydio X2D can see clearly.
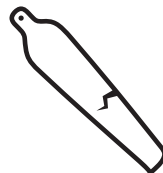
Check your propellers for damage before flying.

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

Safety

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
- Ensure all 4 arms are fully deployed against the hard stops and 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
- Fly with caution in low light, poor visibility, and nighttime conditions - obstacle avoidance is disabled
- Do not fly in extremely hot temperatures above 109°F (43°C)
- Do not fly 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 launch
- 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. Skydio recommends a satellite count of at least 20 when flying over water. Launch and land your drone over a dry surface
- Avoid objects less than 0.5 in (1.27 cm) in diameter such as thin branches, utility lines, ropes, and netting
- Do not fly around objects in motion such as cars, boats, balls, animals, or other drones

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
- Alert messages will display if Skydio X2 determines the environment is not safe for flight
- When instructed to do so, immediately fly Skydio X2 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 years

Regulations

- Follow all civil aviation, such as the FAA or your countries regulatory agency, rules and regulations
- You are responsible for your Skydio X2 at all times, when operating your Skydio X2 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.
- Maintain 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.

> ⓘ **INFO:** Visit _https://skydio.com/safety_ and _https://skydio.com/support_ for more information, helpful tips, videos, and articles.

Getting Started

## Charging Batteries

Using the Skydio Dual Charger

The Skydio Dual Charger simultaneously provides current to two batteries. However, it will prioritize charging the battery with the highest charge, excess input power will begin charging the second battery. Allow approximately two hours to fully charge batteries.

Step 1 - Slide one or both batteries down the guard rails onto the dual charger

- magnets will engage to seat the battery

Step 2 - Connect the provided USB-C cable to the 100 W power adapter an

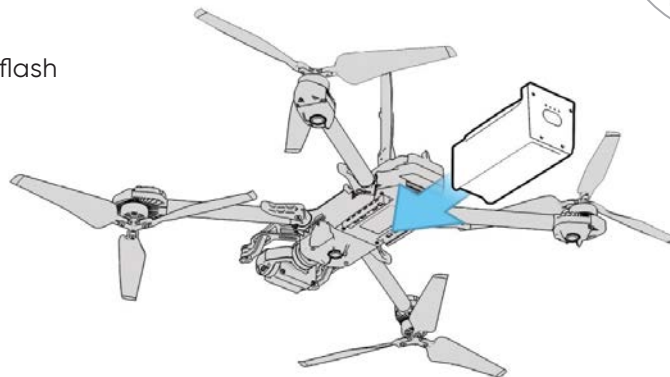**Step 3** - Plug the power adapter into a 100-240 V power source
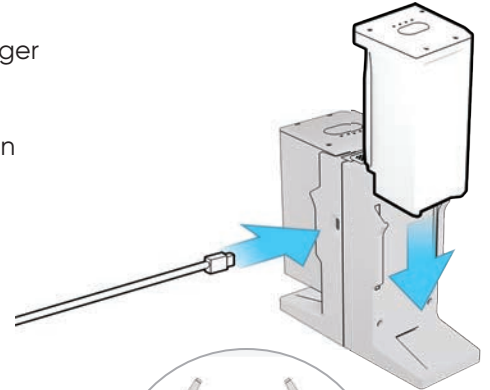
Using Skydio X2D

Step 1 - Slide the battery into the battery tray until it is fully seated

Step 2 - Connect X2D using the USB-C cable and 100 W power adapter

Step 3 - Plug the power adapter into a 100-240 V power source

- X2D will power on
- the battery lights will begin to flash

> ⚠️ **WARNING:** *Skydio X2D batteries are seated using magnets that may potentially attract metallic debris. Prior to installing your battery, visually inspect the magnets and connector pins, to ensure that they are clean and free of debris or damage. Do not use batteries if the magnets or connector pins are damaged.*

Battery Charge Levels

The current charge level is accessed by pressing the power button on the battery:

1 light	● ○ ○ ○	0–37% charged
2 lights	● ● ○ ○	38–62% charged
3 lights	● ● ● ○	63–87% charged
4 lights	● ● ● ●	88–100% charged

Getting Started

Charging Enterprise Controller

Step 1 - Connect the controller using the USB-C cable and the 65 W power adapter

- or an off-the-shelf 18 W or above power adapter

Step 2 - Plug the power adapter into a 100-240 V power source

- flashing lights indicate charging
- the controller will power on and display the charge levels
- lights will remain solid blue for 1 minute and X2D will power off indicating that the charging is complete

> 📝 **NOTE:** *The Skydio Enterprise Controller supports charging while in use, including flying X2D.*

Enterprise Controller Charge Levels

When the controller is powered on or charging, the lights on the front of the controller will indicate the current state of charge. When the controller is powered off, you can view the controller's state of charge by pressing the power button.
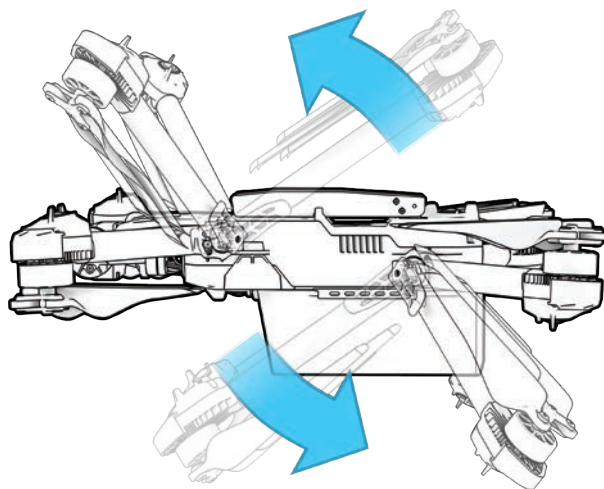
1 red	● ○ ○ ○	5% or less
1 yellow	● ○ ○ ○	6%–15%
1 blue	● ○ ○ ○	16%–37%
2 blue	● ● ○ ○	38%–62%
3 blue	● ● ● ○	63%–87%
4 blue	● ● ● ●	88%–100%

> ⚠️ **WARNING:** *Do not fly when the Skydio Enterprise Controller battery is low. If the controller reaches low battery level when in flight, pilot the drone to a safe location and land immediately.*

Getting Started

Deploy Skydio X2D

Step 1 - Release the 4 arm clamps

Step 2 - Lift the motor arms out and away from the body

- Listen and feel for a click
- If you feel any resistance when opening the arms, push outward (horizontally) on the arm to unseat

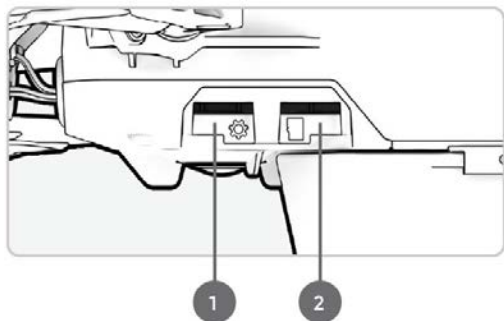**Step 3** - Return the 4 arm clamps to the locked position

- Ensure that the blue marks align

⚠️ **WARNING:** *Propeller blades are sharp. Handle with care.*

Step 4 - Verify that the log and media memory cards are installed
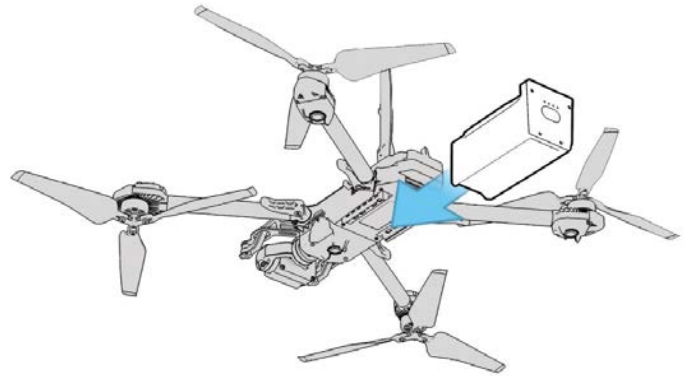
      1. Logs card *(do not remove)* – records logs and supports future updates

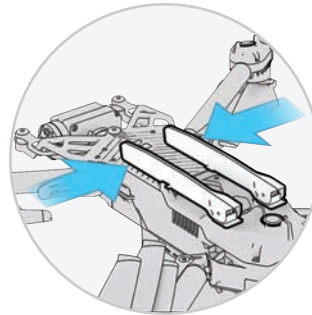   2. Media card – stores images and video

Getting Started

Deploy Skydio X2D

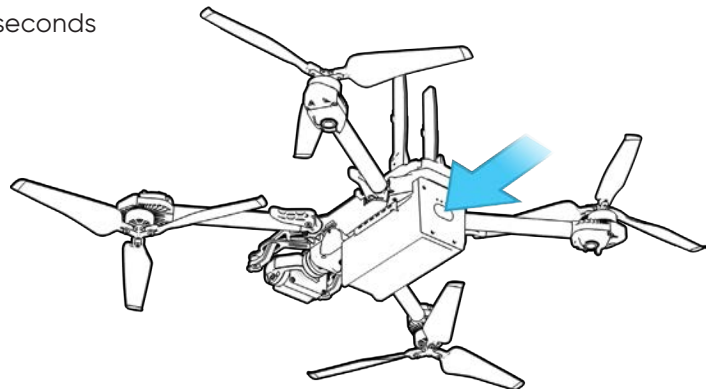**Step 5** – Slide the battery on rails towards the camera until the magnets engage

Step 6 – Gently push the antennas inward to release

- Guide into a vertical position

Step 7 – Power on your Skydio X2D

- Press and hold the power button on the battery for 3 seconds

💡 **TIP:** *This is the suggested order of operations when assembling your X2D for the first time. It is not necessary to unfold the X2D arms and antennas prior to installing the battery and powering on the drone. On subsequent deployments insert the battery and power on the aircraft first, then unfold the arms and antennas while the drone is booting up.*

Getting Started

Activate Enterprise Controller

Step 1 - Open the controller lid gently

- The antennae are embedded in the controller lid

Step 2 - Power on the controller

- Press and hold power button for 3 seconds

Step 3 - Activate the controller

- Read and accept Purchase Terms
- Create a device password to unlock the controller
- The password will be required to unlock the controller when powering on or waking it from a sleep state
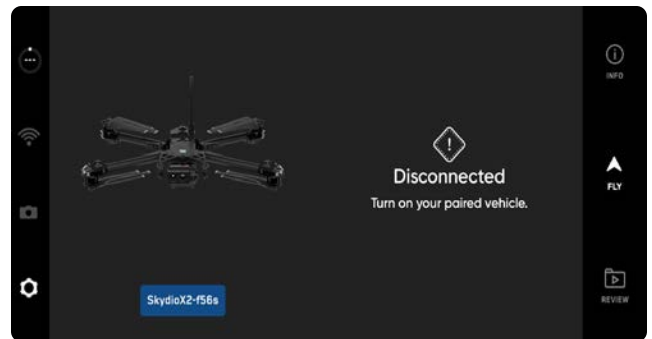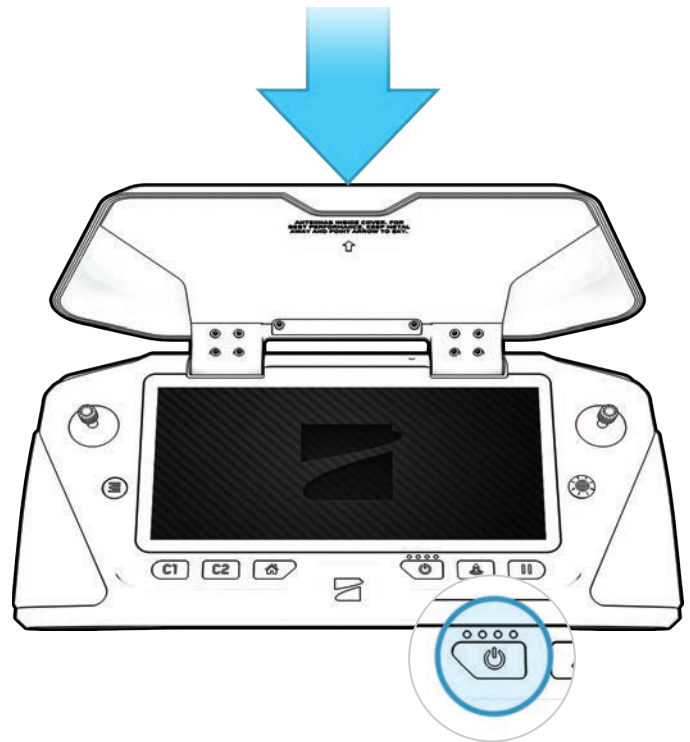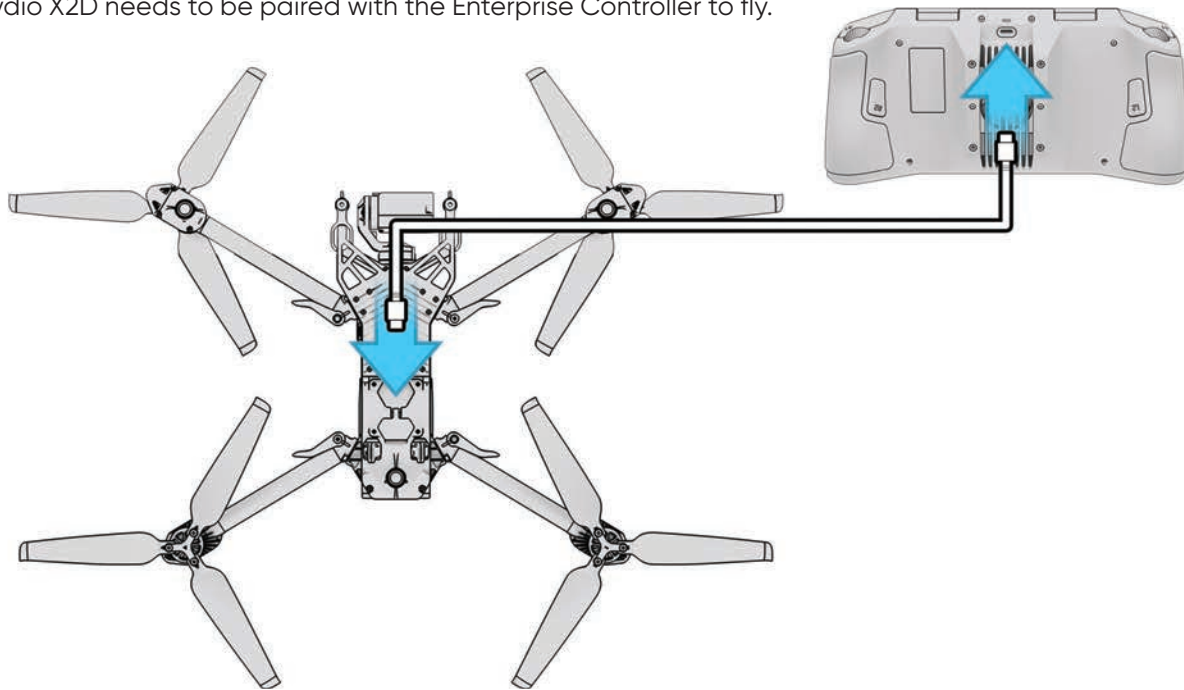

> ⚠️ **WARNING:** *This password cannot be recovered or reset if forgotten! Ensure it is written down and stored in a safe location. If the password is lost, the controller will no longer be usable and will need to be replaced.*

Getting Started

Pair devices

Your Skydio X2D needs to be paired with the Enterprise Controller to fly.
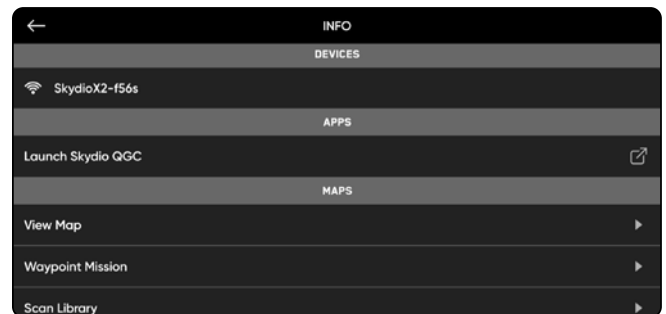

Step 1 - Power on X2D and Enterprise Controller

Step 2 - Connect the controller to X2D

- Using the USB-C cable
- Wait approximately 15 seconds

Step 3 - Verify that your Skydio X2D was paired

- Select the **INFO** menu
- The drone name is listed under Paired Drone

📝   **NOTE:** *Skydio Enterprise Controller can only be paired with one drone at a time.*

Getting Started

Update X2D System

Updates from Skydio contain important enhancements and fixes designed to improve performance, optimize flight controls and features for the operation of your Skydio X2D offline system, Enterprise Controller, and Dual Charger. You can update your vehicles and Enterprise Controller in any order, however it is important that you update the Dual Charger last. You may use the same flash drive (or memory card reader) to update one system at a time or load the update onto several flash drives for simultaneous updates.

There are two ways to receive the update package from Skydio: SD memory card and secure download.

To update your Skydio X2D offline system you will need:

- a computer with an Internet connection
- a memory card reader with USB-C connection **OR** a USB-C flash drive
- that has been authorized by command or IT Security
- formatted to exFAT file system
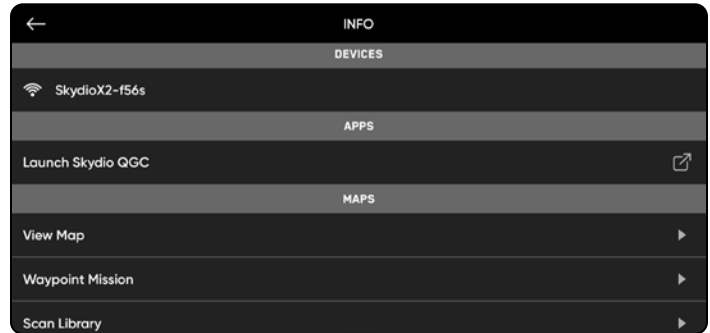
Update using a memory card

Step 1 - Insert the SD card that you received from Skydio into a USB-C memory card reader

Step 2 - Insert the memory card reader into the USB-C port on the vehicle

Step 3 - Power on the vehicle

- the update will begin automatically
- the lights on your drone will pulse blue
- the camera gimbal will disengage and go slack
- the process may take several minutes
- When the update is complete, the camera gimbal will re-engage

Step 4 - remove the USB-C flash drive
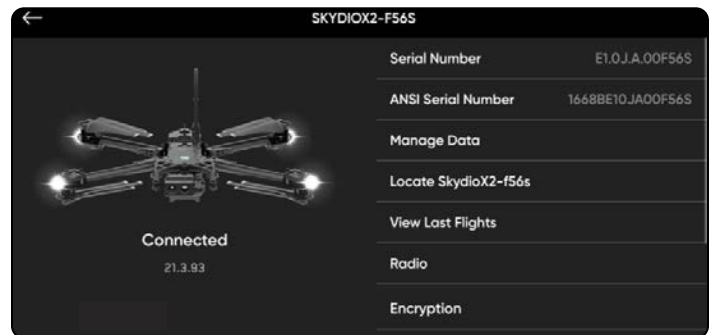
Getting Started

Update using the secure download

Step 1 - Access the files from Skydio Fleet Manager for Offline Drones
- a **.zip file** which is the update for your X2D vehicle
- a **.tar file** which is the update for your Skydio Enterprise Controller

Step 2 - Generate the .zip file and download the .tar file

Step 3 - Insert a memory drive into your computer

Step 4 - Copy the offline_ota folder and the .tar file into the root level of your memory drive
- So that they are not contained inside any other folders
- Safely eject the memory drive from your computer

Step 5 - Insert the memory drive into the USB-C port on the vehicle

Step 6 - Power on the vehicle
- The update will begin automatically
- The lights on your drone will pulse blue
- The camera gimbal will disengage and go slack
- The process may take several minutes
- When the update is complete, the camera gimbal will re-engage

Step 7 - Remove the memory drive

Verify you have correctly installed the update

Step 8 - Power on your Skydio X2D and Skydio Enterprise Controller and connect

Step 9 - Select the **INFO** menu

Step 10 - Select **Paired Drone**
- verify that the software version listed matches the software version provided by Skydio

Update Skydio Enterprise Controller

Step 1 - Power on your controller

Step 2 - Select the **INFO** menu

Step 3 - Select **Controller Update**

Step 4 - Insert the memory drive into your controller

Step 5 - Select **Update**

Step 6 - Navigate to the memory drive root folder

Step 7 - Select the update .tar file

Step 8 - Select **Done**
- The update will begin automatically
- Allow up to five minutes for the update to complete
- During this process, your controller may restart multiple times

Step 9 - Verify that the version number matches the version number provided by Skydio
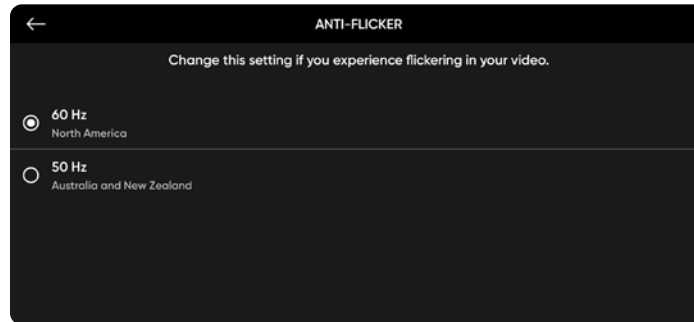
Getting Started

Anti-flicker

Adjust anti-flicker settings if you experience flickering in your video. The setting will persist across flights and power cycles.

- 60 Hz (default) - North America
- 50 Hz - Europe, Australia, Africa

Channel Selection X2D 5 GHz

Manually select your radio frequency channel to avoid congestion from other signals. These are standard 5 GHz WiFi channels that correspond to the following frequencies:

- Auto
- 36: 5180 MHz
- 40: 5200 MHz
- 44: 5220 MHz
- 48: 5240 MHz
- 149: 5745 MHz
- 153: 5765 MHz
- 157: 5785 MHz
- 161: 5805 MHz
- 165: 5825 MHz

To select channels:

    Step 1 - Select the Settings icon

    Step 2 - Select the Drone tab

    Step 3 - Select **Radio Channel**

> 📝 **NOTE:** *Skydio recommends leaving the Channel Selection set to Auto for best results.*

Getting Started

Channel and Bandwidth Selection X2D 1.8 GHz

To select bands and channels:

    Step 1 – Select the **INFO** menu

    Step 2 – Select your drone under Devices

    Step 3 – Select **Radio**

    Step 4 – Select Channel Bandwidth Selection

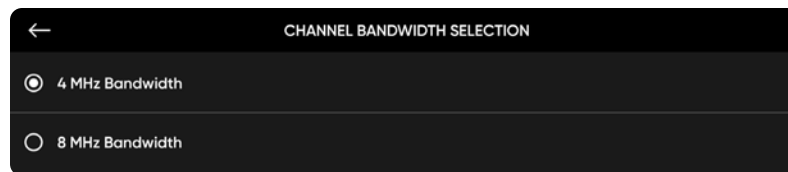   **4 MHz Bandwidth**

        • Channel 3 (1813) MHz – Channel 57 (1867) MHz

      8 MHz Bandwidth

        • Channel 4 (1814) MHz – Channel 56 (1866) MHz

    Step 5 – Select **Finish**

Channel and Band Selection X2D Multiband

Manually select your radio settings, band, channel, and power frequency to avoid congestion from other signals. These are six bands and corresponding channels:

    Step 1 – Select the **INFO** menu

    Step 2 – Select your drone name

    Step 3 – Select the **Radio** menu and the **Band Selection** tab to choose the radio band

    Step 4 – Select the **Radio** menu and select a **Channel**

• Band M1 – 1.6 GHz / channels 1700–1725 MHz

    Due to GPS interference vehicle altitude is limited to 33 ft (10 m) above launch (AGL).

• Band M2 – 1.8 GHz / channels 1780–1850 MHz

• Band M5 – 2.0 GHz / channels 2020–2110 MHZ

• Band M3 – 2.2 GHz / channels 2200–2300 MHz

• Band M4 – 2.3 GHz / channels 2301–2390 MHz

• Band M6 – 2.4 GHz (default) / channels 2400–2500 MHz

Pre-flight

Configure Maps

Import custom QGC and Mapbox tiles to the Skydio Enterprise Controller via a USB-C drive or SD memory card reader.

Import maps

Step 1 - Load your map files onto a USB-C flash drive or SD memory card

Step 2 - Insert the USB-C drive or adapter into the controller
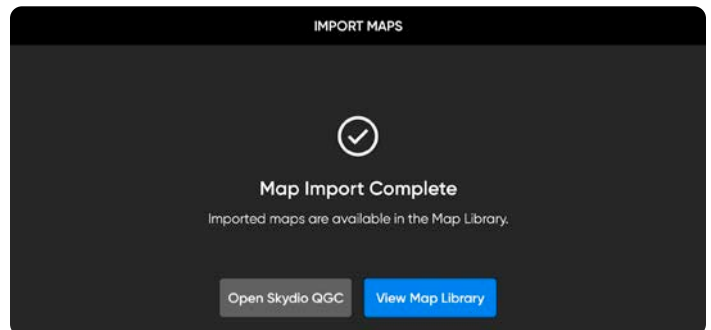
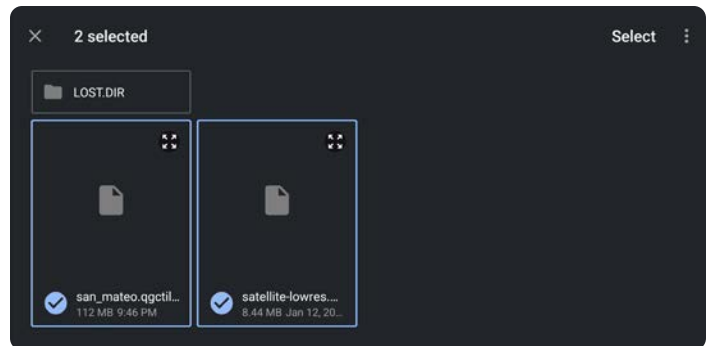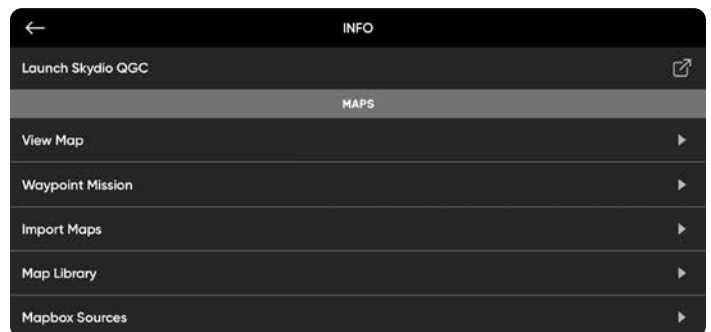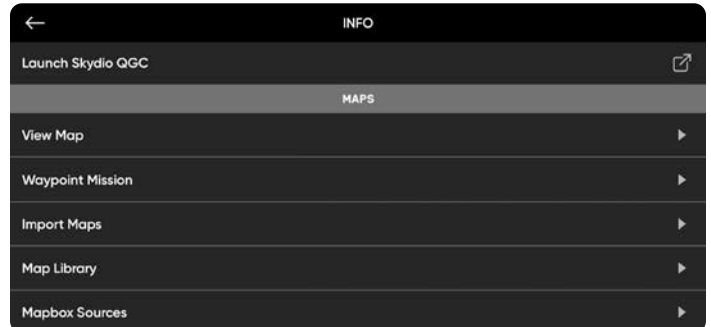**Step 3 -** Select the **INFO** menu

Step 4 - Select **Import Maps**

Step 5 - Select **Select Maps**

- navigate to the storage device
- select the maps to import

Step 6 - Select **Done**

- wait for your maps to import
- select **View Map Library** to review your imported maps
- If you have uploaded a QGC map, you will also see an option to open Skydio QGC

Pre-flight

Encryption

Before you can use the encryption feature on your X2D, you need to provision the vehicle using the Encryption Fob. Provisioning the system for encryption pairs that particular Encryption Fob to the vehicle, so it is important to store the fob with the vehicle. To set up your vehicle for encryption:
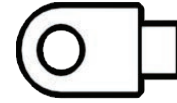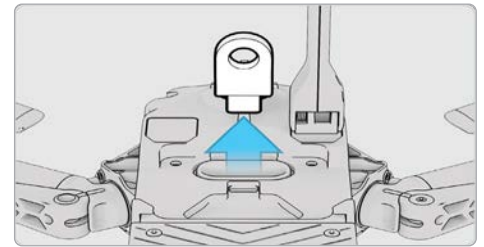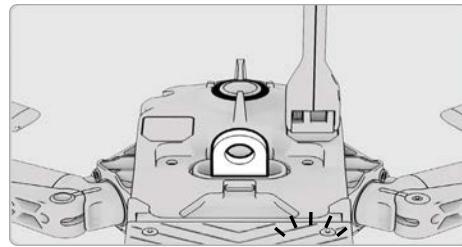
Step 1 - Power on Skydio X2D

Step 2 - Insert the Encryption Fob into the USB-C port on the vehicle

- the lights on the fob will begin blinking

Step 3 - Remove the Encryption Fob when the lights turn off

- you only need to provision the system one time
- Skydio X2D media will now be encrypted
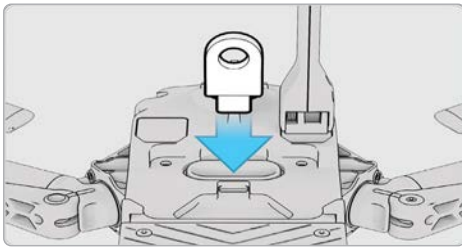
⚠️ **WARNING:** *provisioning the system for encryption pairs that particular fob to the vehicle, so it is important to store the Encryption Fob with the vehicle. Using a different Encryption Fob will overwrite the provisioning and assign the vehicle to the new fob. All encrypted data generated with the original fob will be erased.*

Pre-flight

Enable (or Disable) Encryption

You have the option to enable or disable encryption. When Enable Encryption is selected, all media captured will be encrypted. When Disable Encryption is selected, all media captured will not be encrypted.
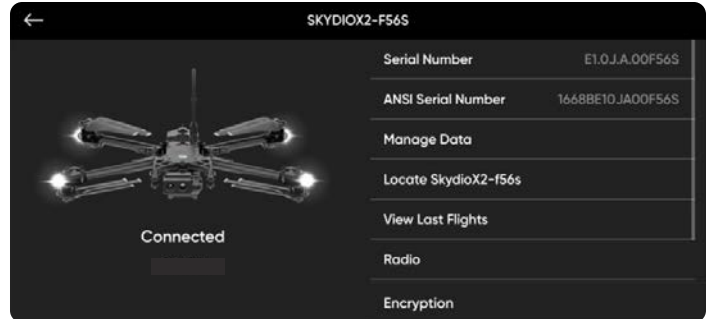To enable or disable encryption:

Step 1 – Power on your Skydio Enterprise Controller
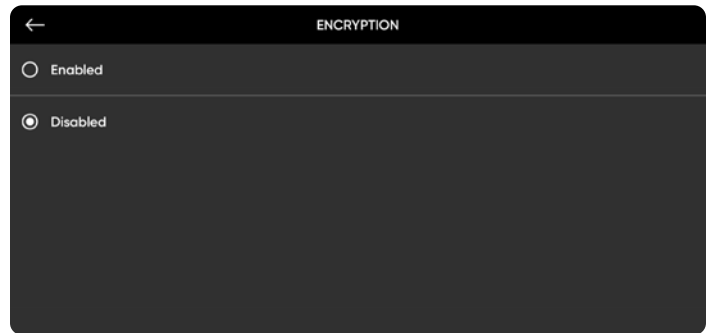
- Wait for your X2D to connect

Step 2 – Select the **INFO** menu

Step 3 – Select your drone under **Devices**

SStep 4 – Select **Encryption**

- the selection is persistent across flights and power cycles

Pre-flight

Plan Waypoint Mission

Step 1 - Select the **INFO** menu

Step 2 - Select **Waypoint Mission**

Step 3 - Pinch and drag on the map to set the starting location of your waypoint mission

Step 4 - Press and hold on the map

Step 5 - Select **Add Waypoint** to set a waypoint

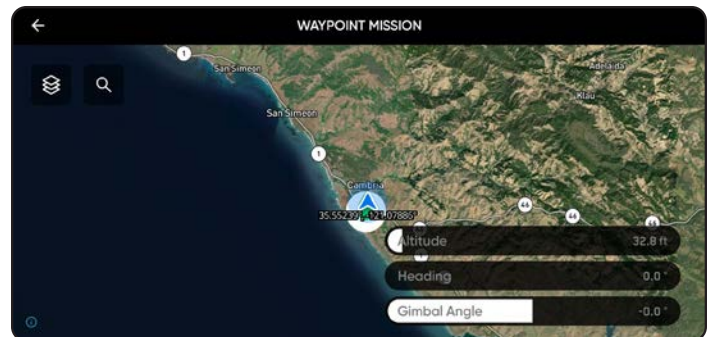**Step 6** - Press and hold on the map again to set your second waypoint

- The vehicle pose setting will match previous waypoint

Step 7 - Set the altitude, heading, and gimbal angle for the selected waypoint

Step 8 - Continue adding waypoints until your mission path is complete

- A mission can support up to 256 waypoints
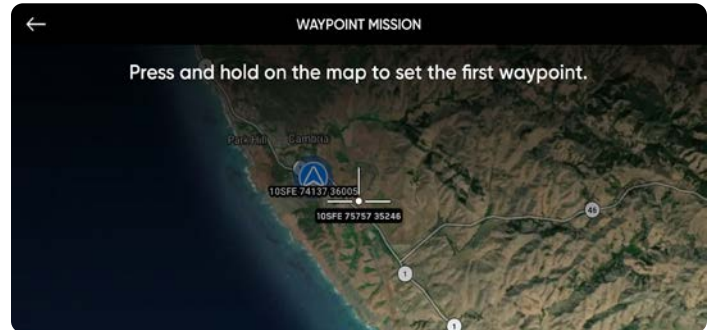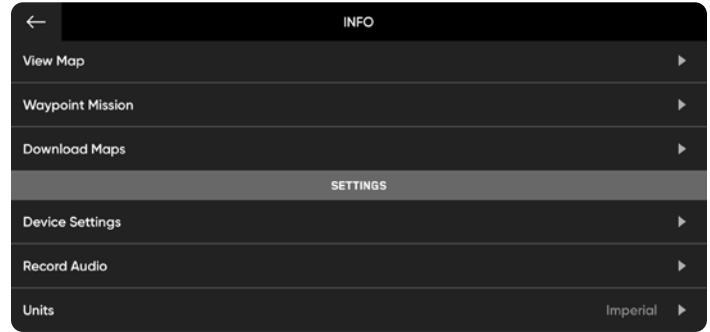
Mission-level settings such as speed and lost communication behavior can be configured while in flight.

- Edit an existing waypoint - tap on the waypoint and adjust the settings.
- Drag to adjust the waypoint placement as desired
- Delete a single waypoint - tap and hold the waypoint and select **Delete**
- Delete the entire mission and clear all waypoints - select the trash can icon and **OK**

> **NOTE:** *Waypoint are created using GPS coordinates. A strong GPS signal (approximately 20 satellites) is required to execute a waypoint mission.*

Pre-flight

Configure Drone settings

The device settings menu provides access to settings for your drone and controller and allows for the configuration of flight controls. View and configure before launch.
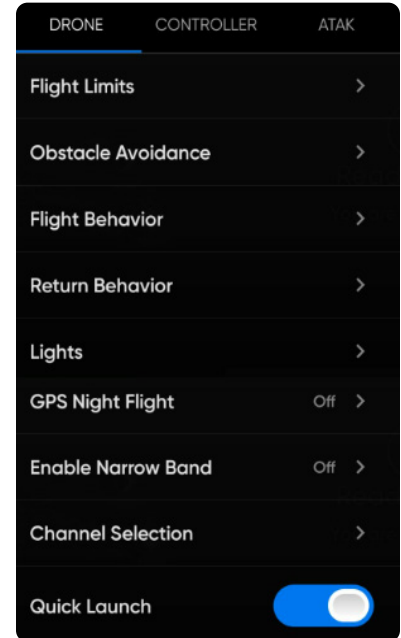
Flight Limits

Height Ceiling –

- adjust – the maximum altitude between 9 ft (3 m) and 1500 ft (457 m)
- disable – the maximum allowed flight altitude

Indoor Height Ceiling – (enabled by default) prevents you from flying above 66 ft (20 m) when your drone does not have access to GPS and cannot see the sky. Disabling the Indoor Height Ceiling setting does not persist across flights or power cycles.

Obstacle Avoidance: adjust the distance X2 will fly from obstacles

- **Standard** (default) – 34 in (86 cm) from obstacles
      top air speed is 25 mph (40 km/h)
- **Close** – 11 in (28 cm) from obstacles
      top ground speed is limited to 18 mph (29 k/m)
- **Minimal** – 4 in (10 cm) from obstacles
      top ground speed is limited to 18 mph (29 k/m)
- **Disabled** – will not avoid obstacles
      top ground speed is limited to 18 mph (29 k/m)
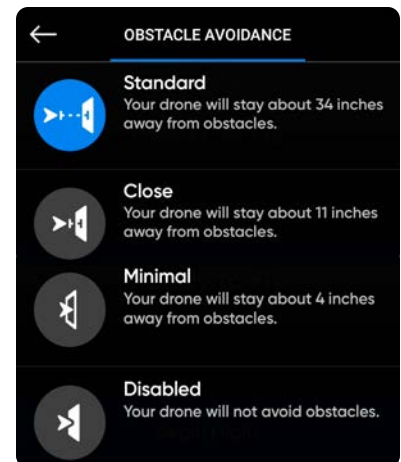
⚠️ **WARNING:** *Flying with Close, Minimal or Disabled obstacle avoidance settings greatly increases risk of collision. Minimal or Disabled obstacle avoidance settings are used to navigate tight spaces and should only be used if you are an experienced pilot. Skydio recommends turning down Controller throttle, roll and pitch sensitivity to the lowest setting and proceeding at a max speed of 2 mph (1 m/s).*

Pre-flight

Configure drone settings

Return Behavior - customize return-to-home behavior

  Drone Looks - set to look toward or away from destination while returning

  Return Type - set to either GPS or vision

- set return type to Vision when you fly in GPS denied environments
- obstacle avoidance setting is respected while returning

Return Height - set the height the drone ascends to before returning

- default return height is set to 66 ft (20 m)

Height Behavior - set to Absolute or Relative

- **Absolute** - ascends to a specified Return Height above the launch point before returning
- **Relative** (default) - ascends to a specified Return Height above the drone's current position before returning

**Return Speed -** set the speed the drone will fly when returning

Low Battery–

Skydio will automatically return to a Home Point when the battery capacity is sufficient to return and land. Setting persists across flights and power cycles. Enable within the Return Behaviors menu

- **Always Ask** (default) - you will be asked to select a low battery behavior when your drone only has enough battery to return and land
- **Return to Home Point** - the drone will automatically return to the set Home Point adhering to the return settings

Lost Connection -

- **Return when Disconnected** - toggle Off to disable Return when Disconnected and the Lost Connection menu. X2 will not return if it loses connection—it will hover until it reaches low battery and land.
- **Wait Before Return** - set the amount of time that you want X2 to wait before it initiates a return flight, allowing time to reconnect.
- **Land Once Returned** - when enabled, X2 will return, hover for a specified amount of time, and then land.
- **Wait Before Land** - set the amount of time between 0 to 300 seconds (the default is 240 seconds) that you want X2 to wait before landing. This setting is only enabled when **Land Once Return** is toggled on.
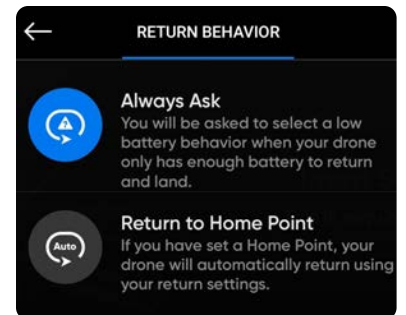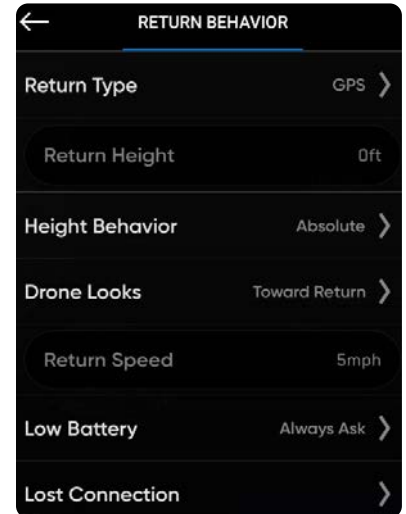
> **NOTE:** *Return behaviors and lost connections settings are persistent across power cycles and flights. Skydio X2 will* **not** *automatically return to the home point when it reaches low battery unless you have Return to Home Point enabled in the Return Behavior menu.*

Pre-flight

Configure Drone settings

Lights: set the navigation lights

- **RGB On** (default) - blue when the drone is powered on, and red and green when in flight
- **RGB Off** - navigation lights will remain off as the drone powers on and throughout flight. Setting persist through flights and power cycles.
- **Infrared** - cannot be seen by the naked eye
- **Strobe** - visually track drone in low-light conditions at a distance of up to 3 mi (4.8 km) *Strobe and Infrared cannot be on at the same time*
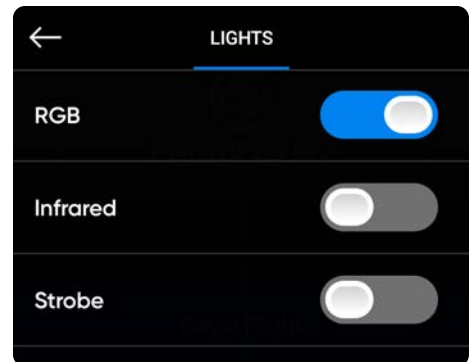
GPS Night Flight: for flight in low-light conditions

- Requires calibrating the magnetometer prior to launch
- Uses GPS sensors instead of vision system to navigate
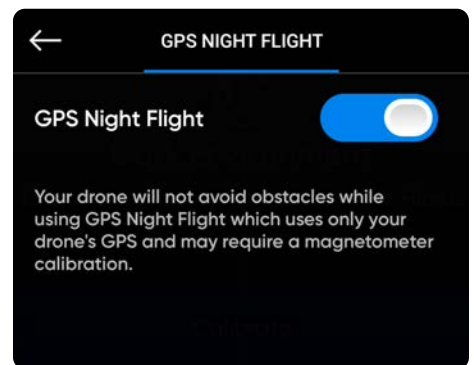
⚠️ **WARNING:** *GPS Night Flight mode requires flying without obstacle avoidance. Skydio X2D may drift slightly when in GPS Night Flight mode, take extra caution when flying in this mode and do not stand near the vehicle.*

Enable Narrow Band: change your radio frequency to a narrower band on 5 GHz vehicles.

- Allows you to fly further away without losing connection
- Extends controller range in open environments
- Video quality may suffer slightly
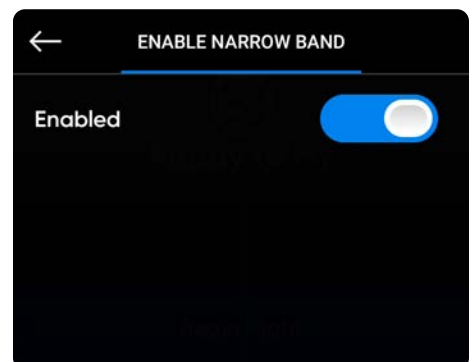
📝 **NOTE:** *You should only enable the narrow band to extend control range when in open and clear environments and when you have a clear line of sight.*

Pre-flight

Configure Controller settings ⚙

Gimbal Speed: controls how quickly the camera gimbal pitches up and down.
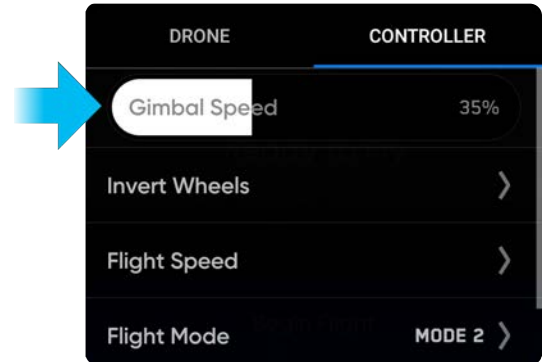
Invert Wheels: inverts the default controls for the Left Wheel (gimbal pitch) and Right Wheel (zoom) on the controller.
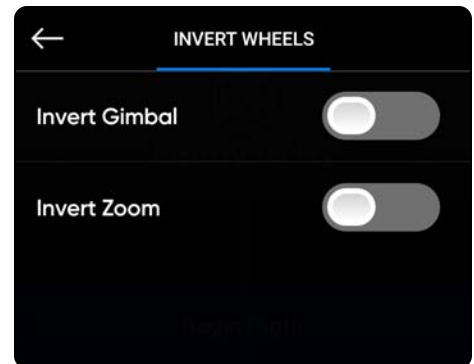
Flight Speed: customize the maximum allowed speed for roll, pitch, yaw, and throttle. Off – the Flight Speed are set to defaults:
- Roll – 25%
- Pitch – 25%
- Yaw – 45%
- Throttle – 83%

Pre-flight

Configure Controller settings

Flight Mode: determines how your Controller joysticks will maneuver X2D. You may switch between Mode 1, 2 (default), and 3 style. To change your flight mode:

Step 1 - Select the Settings icon

Step 2 - Select **Controller**

Step 3 - Select **Flight Mode**

- choose the flight mode that best suits your operating style

Mode 1	Mode 2	Mode 3
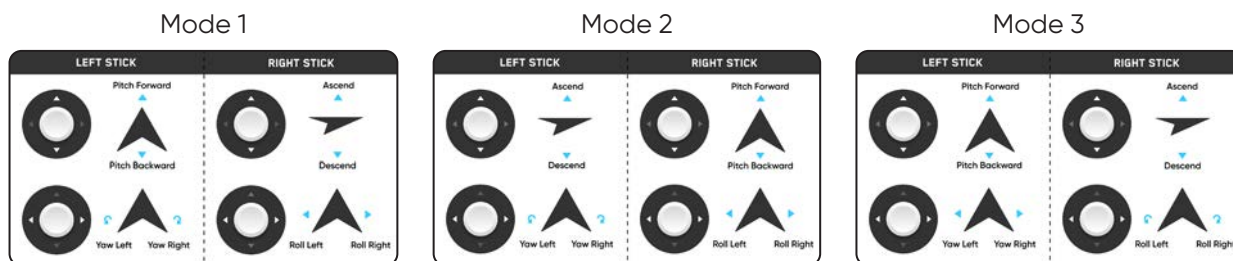
Button Mapping:
Customize buttons and wheels with the following options:

- Left Wheel – Invert Control (gimbal/zoom wheel) Gimbal pitch, No function
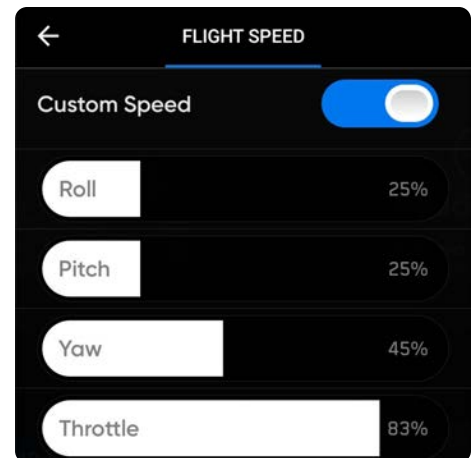- Right Wheel – Digital Zoom, Exposure Compensation, No function
- L2 – No function, Map, Camera, Obstacle Avoidance
- R2 – No function, Map, Camera, Obstacle Avoidance
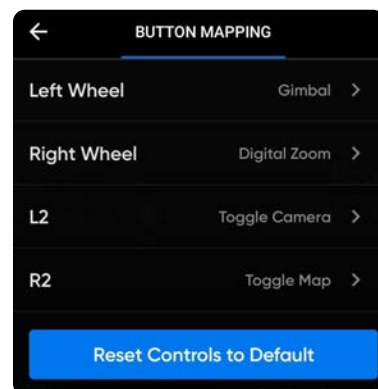
On Screen Display:

- Coordinates – display latitude/longitude or MGRS coordinates
- Telemetry – speed, height above launch point, range from launch point, and camera angle (gimbal pitch) are displayed while in flight

Gesture – opens sub menu to toggle on/off Pinch to Fly and Pinch to Zoom

Double Tap to Fly: toggle on/off double tap to fly

Pre-flight

Configure Controller settings

Thermal Palette (X2D Color/Thermal only) - the thermal camera assigns each pixel a unique color or shade based on a specific temperature data point. Changing the thermal palette can help highlight specific warm or cold people, objects, or points of interest for better identification confidence and decision-making. Thermal palette selection persists across flights and power cycles.

    Step 1 - Select the **Device settings** menu icon

    Step 2 - Select the **Controller** tab

    Step 3 - Select **On Screen Display**

    Step 4 - Select **Thermal**

      • Toggle **On Screen PIP** on or off

      • Select a thermal palette
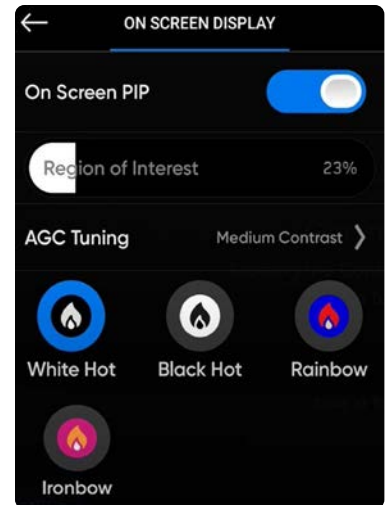
White Hot (default) - displays warmer objects in white and cooler objects in black to generate detailed images—well suited for use in urban environments.

Black Hot - is an inverted White Hot, displaying warmer objects as black and cooler objects as white.

Rainbow - uses colors to display subtle variations in scenes with low-contrast heat differentials.

Ironbow - uses color to display heat distribution and thermal anomalies. Warmer objects are presented in lighter colors and colder objects in darker colors.

    Step 5 - Select the **Region of Interest** between 10% - 100%

Select a Region of Interest (ROI) on your thermal image and apply AGC to that specific area. The area inside the ROI will be optimized with AGC, while the area outside the region of interest can still be viewed.

    Step 6 - Select the **AGC Tuning**

Tune the Automatic Gain Control (AGC) or signal noise in your thermal image to automatically optimize for the contrast you have selected. Options include:

- Reconnaissance
- Low contrast
- Medium contrast (default)
- High contrast
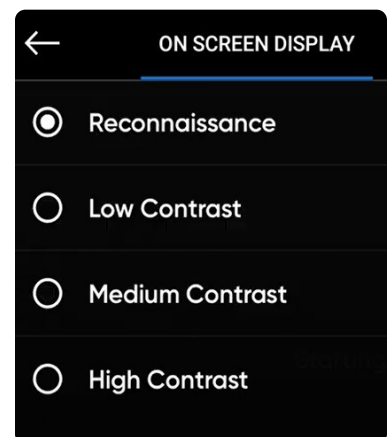
Pre-flight

Vehicle Mode

Skydio offers three vehicle modes selected pre-flight for a customized flight experience. Vehicle Modes persist across flights and power cycles. To exit, land and select a new vehicle mode. Vehicle modes include:

- Skills (default)
- 3D Scan (*additional license required*)
- Attitude
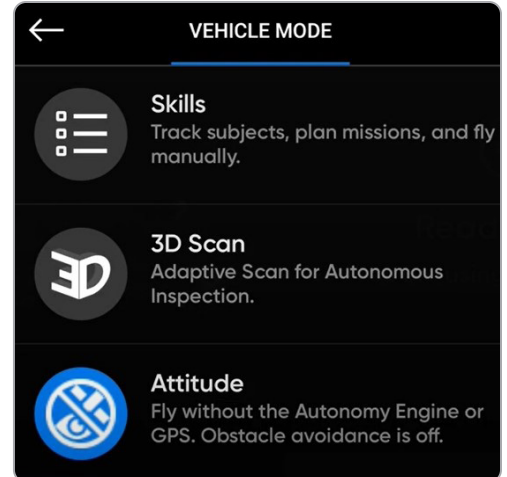
Skills

Skydio offers a range of manual and autonomous controls called flight skills. Select your desired skill and Skydio X2 will intelligently fly itself to get the best shot. Access available skills by selecting the Skill Menu and adjust the controls by selecting the Skills settings.

3D Scan

To initiate a 3D Capture or 2D Capture you need to change the Vehicle Mode from Skills to 3D Scan. Your Vehicle Mode will persist through flights and power cycles.

Step 1 - Power on your drone and controlling device

Step 2 - Select **Use 3D Scan**

Step 3 - Confirm reboot

- The drone will automatically restart and reconnect to the controlling device
- Ensure your Logs Card has been formatted before starting a scan

Pre-flight

Vehicle Mode

Attitude

Attitude Mode allows you to disable the visual and GPS navigation systems. Designed to be flown by expert pilots, in GPS-denied environments, or where there is the potential for jamming, Attitude Mode offers a pure manual flight experience. You have direct stick control of the aircraft's throttle, yaw rate, pitch and roll angles, rather than relying on automatic altitude and position stabilization. All autonomous functions, such as Return to Home and Obstacle Avoidance, are disabled.

> ⚠️ **WARNING:** *accidents resulting from an Attitude Mode flight are not covered under warranty and may result in injury or property damage. Attitude Mode should only be used by Expert Pilots. Please fly cautiously and conservatively as the Skydio safety features are disabled. Do not hand launch or hand land.*

To Launch:

Step 1 - Select the **Settings** menu icon

- Attitude Mode selection is only available pre-flight

Step 2 - Select the **Drone** tab

Step 3 - Select **Vehicle Mode**

Step 4 - Select **Attitude**

- The drone will reboot and calibrate

Step 5 - Select **Begin Flight**

Step 6 - Arm the motors

- Hold the throttle joystick down in a full-throttle down position and then press and hold the launch/land button for 1 second
- The motors will start to spin at idle speed

Step 7 - Maintain a full-throttle down until you are ready to launch

Step 8 - Launch

To Land:

There are no autonomous landing features while in Attitude Mode. You will need to manually disarm as Skydio X2D will not automatically detect touchdown.

Step 1 - Fly to a clear, level, and safe landing area

Step 2 - Slowly descend using the throttle joystick

Step 3 - Minimize lateral drift

- Correct the roll and pitch to minimize lateral drift as your drone touches down

Step 4 - Simultaneously press L2 and R2 to disarm

- The propeller blades will stop spinning

> ⚠️ **WARNING:** *pressing L2 and R2 simultaneously at any time during the flight will disarm the drone and stop the propeller blades resulting in a free fall.*

Pre-flight

Android Team Awareness Kit (ATAK)

The integration of the Skydio Enterprise Controller (model-S) and the Android Team Awareness Kit (ATAK) app allows you to seamlessly monitor your Skydio fleet. ATAK provides geospatial information about your drones and controllers for increased situational awareness in the field. To access the Skydio ATAK offline integration, ensure that you are using the correct Enterprise Controller model. Locate the model on the back of the Enterprise Controller. Compatible units will include SBR or S at the end of the model number.

Radios that have been tested with Skydio ATAK offline integration include:
- Silvus
- TrellisWare
- Persistent Systems

> **NOTE:** You must connect to your network using a USB-C Ethernet cable. WiFi connections are not available. Your radio must include Dynamic Host Configuration Protocol (DHCP)

Step 1 - Select the **Device settings** menu to add the ATAK server

Step 2 - Navigate to the ATAK menu tab and select **Start ATAK App**

Step 3 - Select **Network Connections**

Step 4 - Select **Add A Server**

Step 5 - Enter the required fields
- Server name
- IP address
- Port
- TCP/SSL certificates

Step 6 - Once connected, the server will appear under **Known ATAK Servers**
- Select the **Connection Status** icon to view the connected servers

Step 7 - Select the RTSP tab

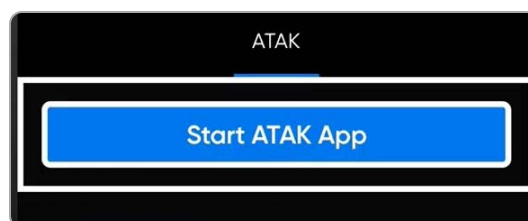**Step 8** - Toggle on **Stream Enabled** and complete the required fields
- Stream Name
- IP Address
- Port

Step 9 - Select the **Device settings** menu

Step 10 - Select the **ATAK** tab

Step 11 - Select **Network Connections**

Step 12 - Select the name of the server to connect

> **NOTE:** When switching between the color and thermal camera feed, viewers of the stream must restart streaming.

Pre-flight

Flight controls

Touch gestures:

- Drag vertically to increase or decrease gimbal pitch
- Drag horizontally to adjust yaw
- Pinch and drag your fingers away from each other to digitally zoom in up to 16x
- Pinch and drag your fingers toward each other to zoom out back to 1x, then out to Superzoom
- Double-tap anywhere on the fly screen to select a location and X2 will fly to that location
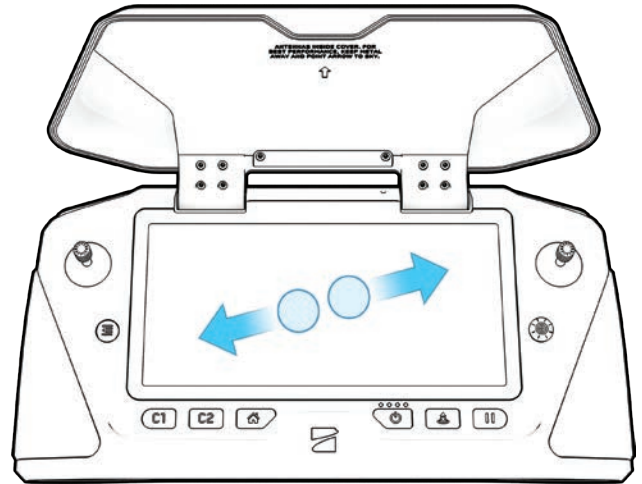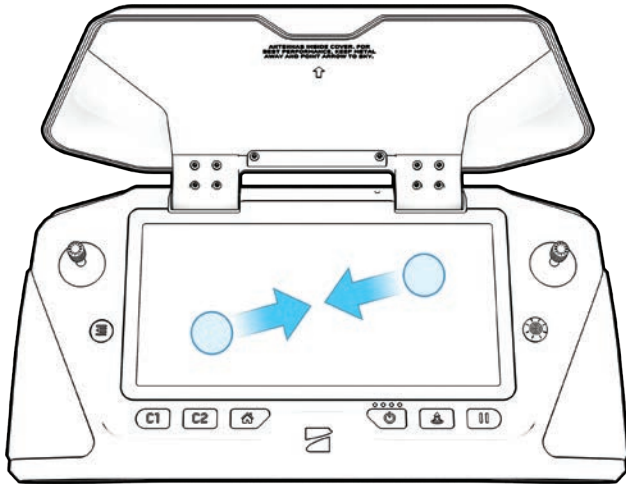
Directional pad (D-pad) controls:
Navigate through settings and screens: push up, down, left, or right to select, press in
Adjust sliders:

- Scroll until the slider is highlighted
- Press in to select—the slider will turn blue to indicate it is active

    Push left or right to adjust slider values, then press in to confirm

    Use Back button to exit a menu

Pre-flight

Inspection

Before each flight, perform a pre-flight inspection to ensure your Skydio X2D is safe and ready to fly.

1. **Inspect chassis –** inspect the vehicle chassis to ensure it is free of damage.

2. **Inspect motor arms –** verify that they are free of damage and assembled properly. When assembled and viewing the drone head-on, arms should be parallel to the chassis.
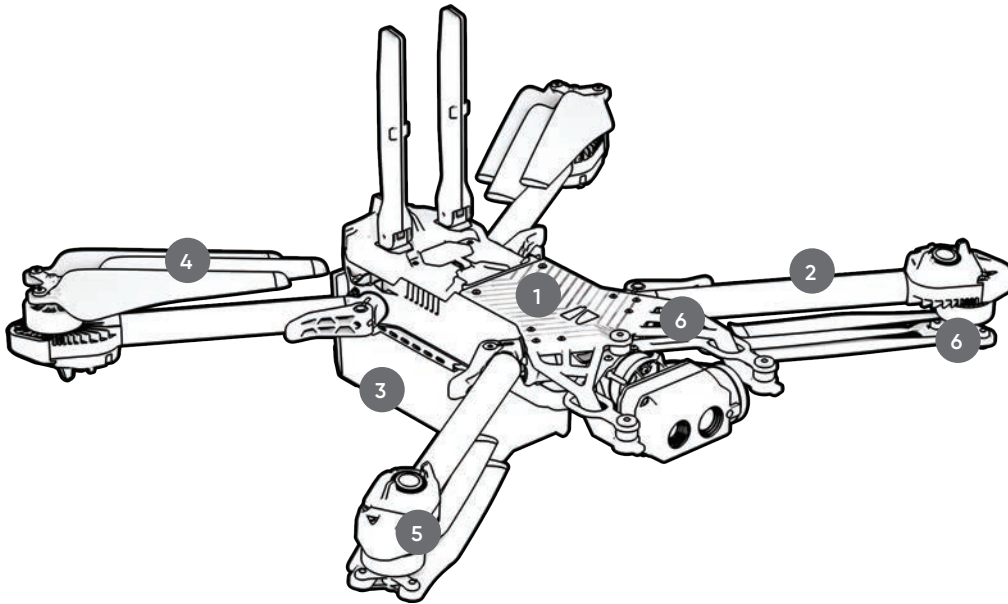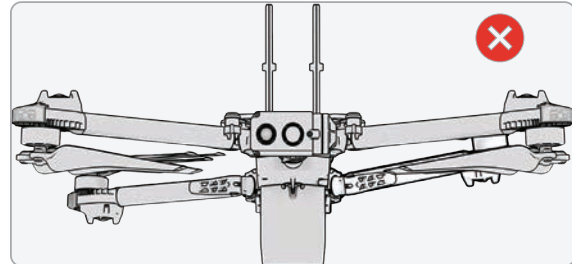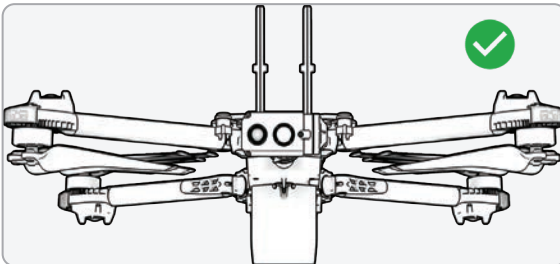

3. **Inspect battery –** Skydio X2D uses magnets to seat the battery that may attract metallic debris. Visually inspect the battery and connector pins to ensure they are free of debris and damage. Verify the battery is fully seated in the vehicle prior to takeoff.

4. **Inspect propellers –** Ensure that propellers are firmly attached and free of nicks, cracks, and damage. Do not fly with damaged propellers. Fan propellers out so that the blades are separated.

5. **Clean cameras lenses –** use a clean microfiber cloth to ensure that all cameras are dust and smudge-free before every flight.

6. **Inspect motor hubs –** ensure that they are free of damage and debris.

Flight

First flight

Before you begin your first flight, please read and follow all of the safety guidelines https://skydio.com/safety.

10 ft

10 ft
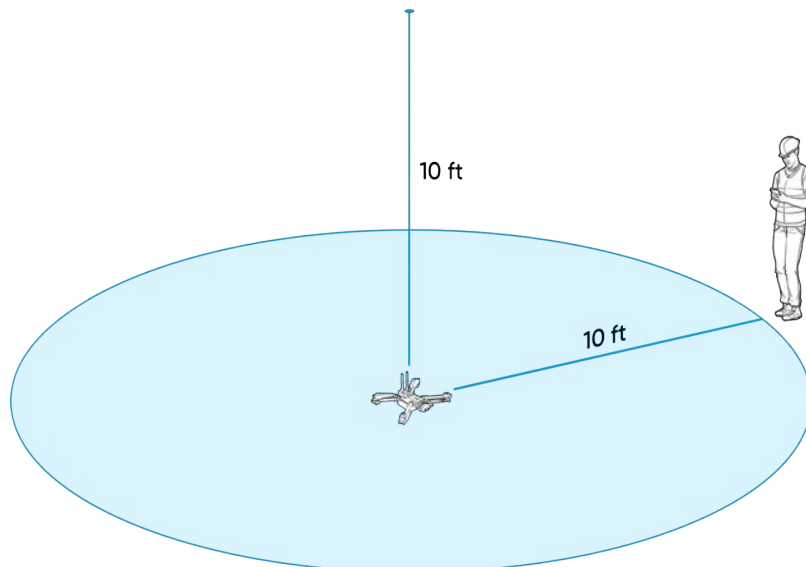
> ⚠️ **WARNING:** *Skydio recommends flying your Skydio X2 in normal daylight or brightly lit conditions will full obstacle avoidance to get comfortable with the system before attempting to fly at night or with reduced obstacle avoidance. Obstacle avoidance is disabled when in GPS Night Flight Mode.*

Launch
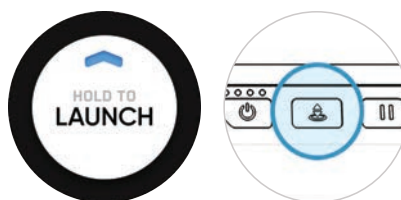
Step 1 - Find a clear area to launch

Step 2 - Place X2D on a flat, stable surface

Step 3 - Select **Launch** on the Fly screen *or* Press and hold the **Launch**/**Land** button on the Controller

- X2D will arm and ascend to 10 ft (3 m) and hover in place

> 📝 **NOTE:** *Skydio X2D requires a stable GPS connection to fly greater than 33 ft (10 m) above the launch point. To fly higher than 33 ft (10 m), lateral flight in all directions may be required to establish heading.*

Flight

Hand launch

> ⚠️ **WARNING:** *hand launch and landing may cause server injury if not performed properly and should only be used when* *necessary.* ***NEVER hand launch your X2D when in GPS Night Flight mode,*** *as it may cause severe injury. To avoid injury* *stay away from and do not touch rotating propellers when they are spinning.*

Step 1 - Identify a clear area to launch, 10 ft (3 m) above, 15 ft (4.5 m) in front, and 3 ft (1 m) on either side

- Do not hand launch on windy days. If there is any wind, for your safety ensure that it is not blowing towards you
- If the wind is gusty or coming from different directions, consider a ground launch

Step 2 - Create a launch pad on your open hand by lightly gripping the battery to stabilize, keeping the drone level and still

- Keep your fingers below the chassis and away from the propellers at all times
- Hold X2D at arm's length from your body

Step 3 - Point the camera away from you

Step 4 - Ensure that the rear propellers will not make contact with your arm

Step 5 - Initiate launch using

- The controlling device - select the launch button
- Quick Launch - toggle on in the **Settings** menu under the **Drone** tab and press the battery power button four times

Step 6 - As the propellers begin to spin up slowly relax your grip. Keep your hand still and level.

X2D will slide off your palm and take flight

- Do not push or throw the vehicle up in the air

Acquire GPS Lock

Immediately after launching, fly laterally to acquire a GPS lock. This is a critical step that must be taken if you are going to fly your drone over water.

- If you can fly your drone 33 ft (10 m) above ground level when outdoors you have acquired a GPS lock
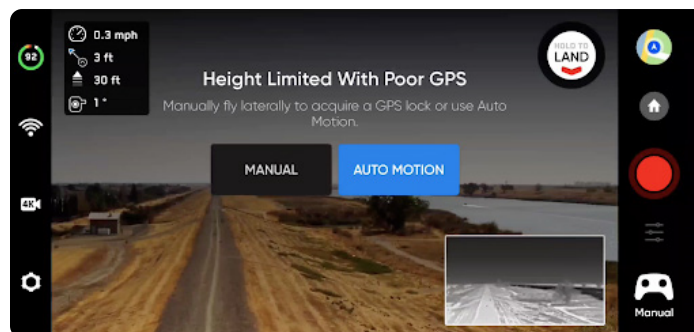
> ⚠️ **WARNING:** *Failure to acquire GPS lock prior to flight over water may result in erratic flight and/or emergency landing.*

Flight

Flight screen

Telemetry

Launch/Land

Battery indicator

Connection status

Camera settings

Device settings menu

Map view

Return location

Recording Indicator

Skill Settings

Skills Menu

Picture in Picture (PIP)
X2D Color/Thermal
Only
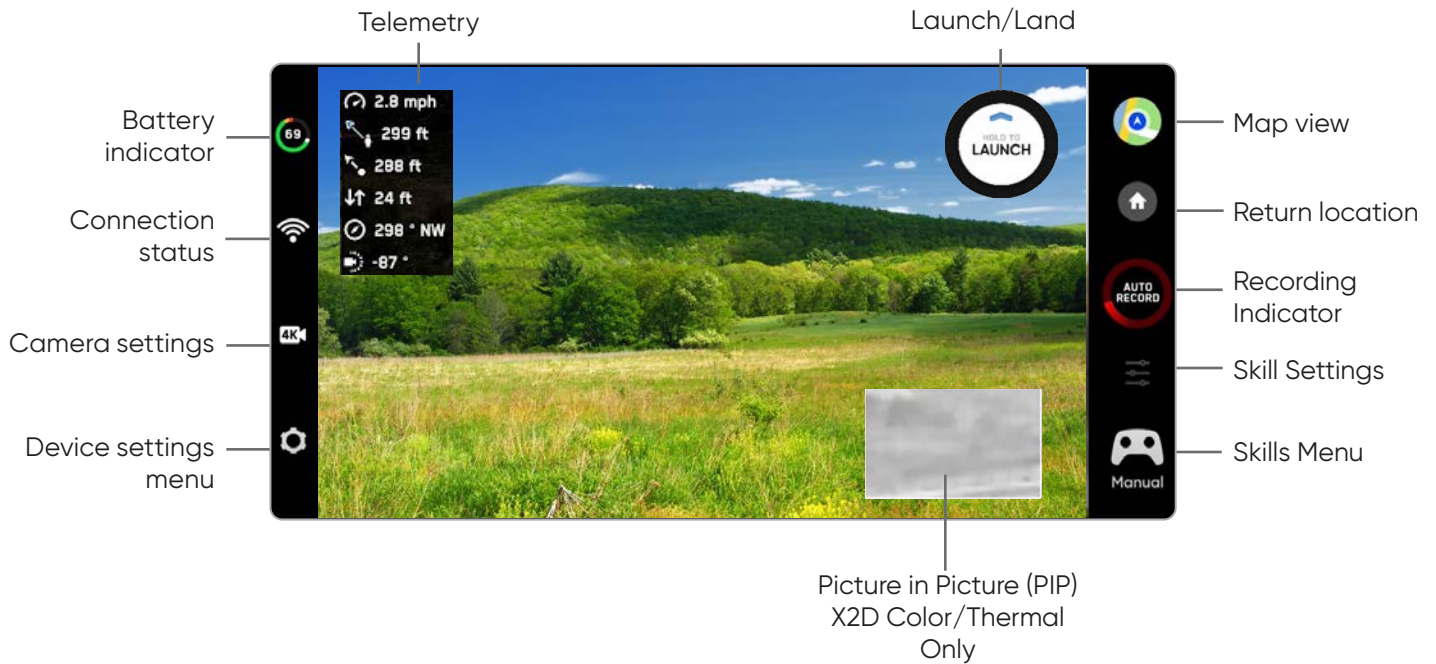
Telemetry

Reference flight telemetry data in the top left corner of the live camera feed.

- Speed of your drone
- Distance from Controller
- Distance from Launch
- Elevation above ground level (AGL)
- Compass Heading in degrees ranging from 0° – 359° and cardinal directions
- Gimbal Pitch –90° to 90°

Flight

Battery indicator

Battery indicator messaging displays how much battery is available for flight, how much battery capacity available for a return trip, and how much battery is required to land.

- **Percentage** - displays battery charge remaining
- **Green** - indicates battery capacity for nominal flight before the time limit required to safely return and land
- **Yellow** - indicates how much battery capacity is required to safely return
- **Red** - indicates how much battery capacity is required to land
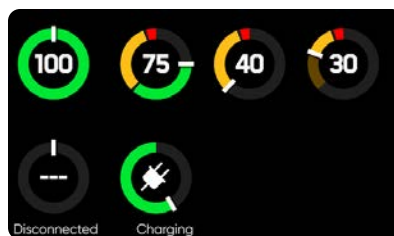- **Countdown** - battery capacity has less than two-minutes of flight time available for landing the indicator will change to a countdown
- **Landing** - battery capacity is zero the indicator will change to an alert symbol and X2D will land

> **NOTE:** *Flight time dynamically changes based on altitude and distance to home.*

Connection Status

The connection status indicator displays the current strength of the signal connection between your controlling device and your X2, the GPS quality, the number of satellites, and TAK servers your drone is connected to. Select the connection status icon to view.

For the best signal connection:

- maintain a direct line of sight between the controller and X2
- for close range high altitude flight – point the controller cover (broad side) toward X2
- max range flight - point the controller cover (broad side) toward X2 while keeping the controller as far away from your body as possible. Bringing the controller too close to your body will impact wireless performance.
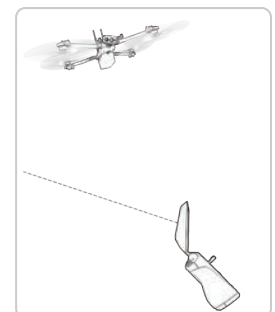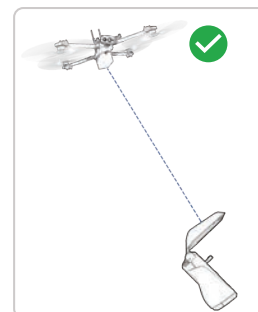
> **NOTE:** *Signal strength and maximum control range may be affected when flying in areas with electromagnetic interference. As signal strength decreases, users may experience a lower quality video feed or a delay in their controls.*

Flight

Camera settings 4K

Change between Video and Photo recording modes. Skydio X2D can capture photos or video but not both at the same time, and your color and thermal cameras will always be in the same recording mode. Whenever X2D captures a photo or video, it will capture one file with the color camera and a second with the thermal camera.
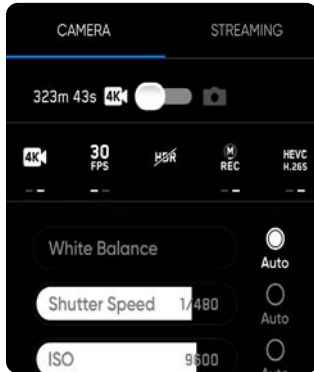
Video Capture Settings
- Resolution
- Frame rate
- HDR On/Off*
- Auto / Manual Recording
- Video Codec**
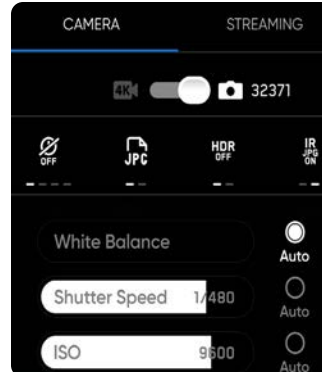- White Balance
- Shutter Speed
- ISO
- Exposure

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

> **NOTE**: Changing the camera settings before launch may cause Skydio X2D to return to the preflight screen and re-calibrate its vision system. Some video capture settings (such as video resolution and frame rate) cannot be changed while the drone is actively zooming. Digital 16x zoom (8x for thermal camera) is not supported in all video resolutions and framerates.

Recording indicators
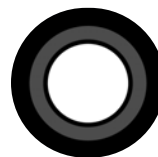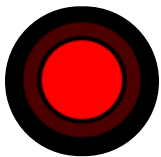
AUTO RECORD	Recoding Video: Auto
(stop icon)	Recoding Video: Manual
(red circle)	Recording Paused: Manual
Photo Button	Photo Button
5 SEC.	Interval Photos

* HDR is not supported in all video resolutions and framerates.

** Skydio X2D can record video in either AVC (H.264) or HEVC (H.265). Different mobile devices and personal computers have different compatibility with these encoding standards. Be sure to choose the encoding standard that is best suited to your desired workflow.

*** When Photo Interval is enabled X2D will continuously capture photos at the specified time interval until the setting is disabled or the flight ends.

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

***** DNG photos are not displayed in the media tab and may be retrieved directly from the microSD card.

Flight

Zoom

Zoom-in while Tracking Subject - provides a clear and enlarged view of the individual or vehicle being tracked, allowing you to initiate a track skill and digitally zoom-in, 3x with color and 1.5x with thermal.

Zoom for your thermal camera is correlated to that of your color camera. For example, when you are at 8x zoom on the color camera (50% of the 16x max zoom level), the thermal view is at 4x zoom (50% of its full zoom of 8x). When at 100% of the color camera 16x zoom, the thermal camera is at 100% of its zoom of 8x.
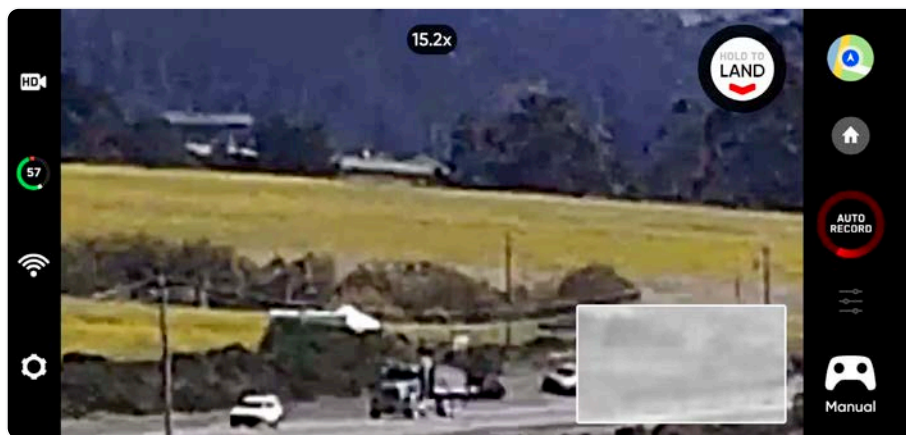
> 📝 **NOTE**: *As you zoom in, X2D camera tilt and yaw will be exponentially reduced for smoother movement.*

To zoom in digitally, place your finger on the right controller wheel, then push it to the left.
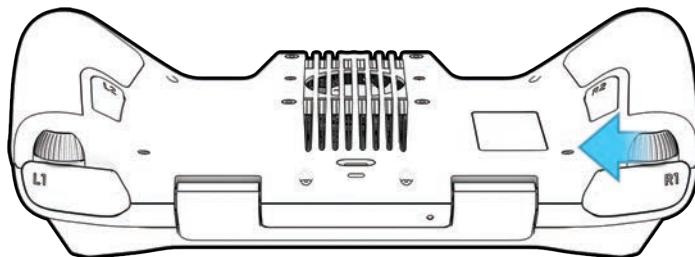
You may also pinch-to-zoom on the controller touch screen.

Tap on the zoom indicator at the top of the screen to quickly snap back to 1x zoom (MIN).
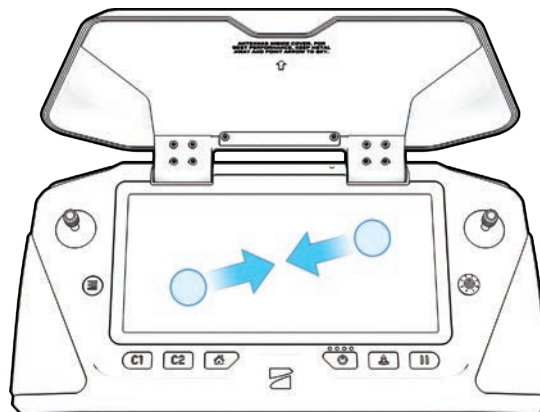
Flight

Superzoom

Zoom out to an equirectangular view of your surroundings. Skydio X2D uses six, 4k navigation cameras to create this omni-directional view in real-time, allowing you to maximize your in-flight situational awareness.

To zoom out to Superzoom, place your finger on the right controller wheel, then pull it to the right.
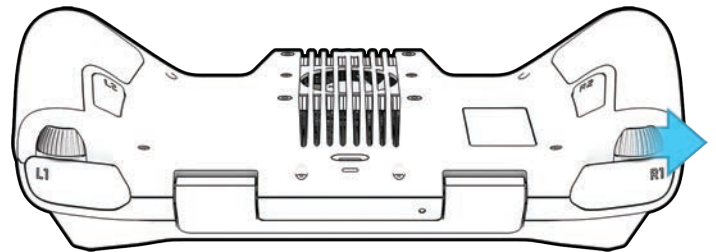
Pinch-to-zoom on the controller touch screen.

If Skydio X2D screen view is already zoomed in, you will first need to zoom out to 1x before you can zoom out again to Superzoom.

Select the zoom indicator at the top of the screen to quickly snap back to 1x zoom (MIN).
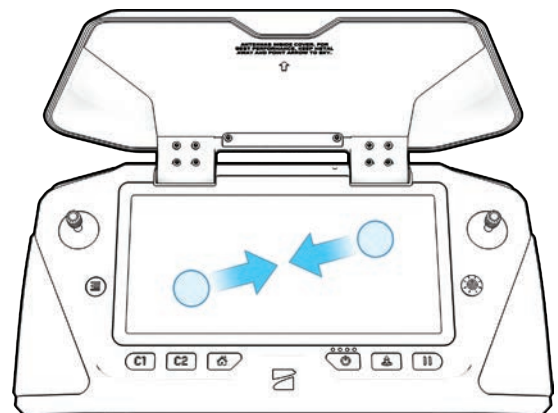
Flight

Zoom Recording

Recorded Footage

Depending on your recording mode and zoom setting in flight, your recorded footage may or may not be zoomed in:

- If the video is zoomed in while recording, the resulting video file will also be zoomed in.
- photos taken while zoomed in will reflect the zoom level
- If video is being recorded or photos are taken while zoomed out to Superzoom, the resulting photos and video will remain at 1x zoom.

Video Capture Settings

While actively zooming in, the video capture settings will be locked:

- Resolution
- Framerate
- HDR On/Off
- Auto/Manual Recording
- Video Codec

To change your video capture settings, reset the zoom level back to 1x.

Compatibility

Zoom and Superzoom as well as camera tilt are currently only available while in flight. You will not be able to activate the zoom feature while the drone is grounded.

Digital zoom – Digital Zoom is not compatible with all video recording modes. To enable zoom while recording video, switch your video mode:

Video Mode	Zoom Compatible
1080p @ 30fps	YES
4k @ 30fps	YES
4k @ 60fps	NO

> **(i) INFO:** *Zoom is possible up to 3x when using the Track in Place skill*

Flight

Map view

Select the map icon for map view, for the GPS location of your controller, Skydio X2D, and the launch are all indicated on the map.

- Select the map icon to exit map view
- Long-press on the map and select **Fly Here Now** from the menu. Skydio X2D will warn you if the selected destination is far away or outside the expected battery range
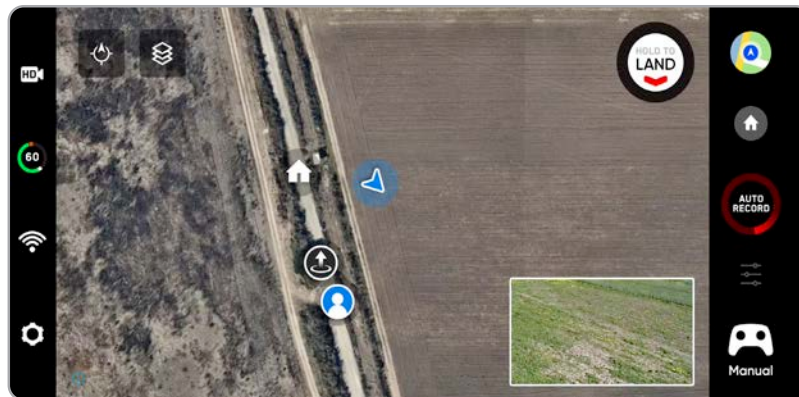
Skydio X2D

Controller

Home Point

Launch Point

Picture-in-Picture (PIP)

Show Thermal (X2D Color/Thermal only) - toggles the display of the thermal camera live feed.

- On (default) displays live feed from the color and thermal cameras as well as a small picture-in-picture (PIP) feed from the thermal camera
- Off and only the live feed from the color camera will display

PIP (X2D Color/Thermal only) - live feed of the thermal camera. Tap on the PIP to toggle between viewing the thermal camera feed full screen and the color camera feed full screen.

Flight

Flight Skills

Skydio offers a range of manual and autonomous controls called flight skills. Select your desired skill and Skydio X2D will intelligently fly itself to get the best shot:

- **General**
- **Cinematic**
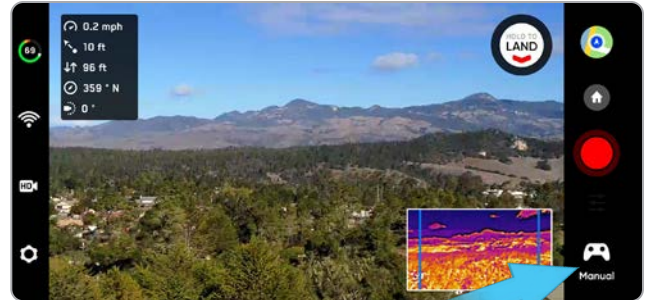
Manual - Default

Traditional flying experience. Obstacle avoidance settings will persist when flying manually, allowing Skydio X2 to route itself around obstacles, modifying any commands that could potentially cause a collision.

Orbit Point

Rotate around a user-selected point-of-interest in either a clockwise or counter-clockwise direction, keeping the point in the center of the frame.

Track in Place

Hover in a fixed position, as if affixed to a virtual tripod, rotating and tilting the camera to look at the subject as they move.

Waypoints

Create and execute multi-waypoint GPS missions.

KeyFrame

X2 will capture continuous shots along a user defined spline with complex, cinematic, and smooth camera motion.

Scout

Uses Skydio Beacon or the Enterprise Controller as a GPS tracking device. Scout allows you to follow and track a GPS position at long-range without manually locking onto a subject.

Panorama

Three different types of panoramic photos: horizontal, vertical, and spherical.

Skills settings

Each skill may have its own custom settings which only affect the selected skill. Select the skill settings icon to customize each of the settings to suit your needs.

Flight

Orbit Point

Skydio X2D will rotate around a user-selected point-of-interest in either a clockwise or counter-clockwise direction, keeping the point in the center of the frame enabling situational awareness, surveillance, and over-watch of any structure or locale.

Step 1 - Select **Orbit Point** from the Skills Menu

Step 2 - Select **Map View**

Step 3 - Fly to the edge of your orbit

Step 4 - Long-press on the map

Step 5 - Select **Set Focus Point**

- the range of the orbit is set to the current distance of X2D from the focus point

Step 6 - Set the direction and speed for the orbit

- using the on-screen slider or controller joystick that controls roll

Step 7 - Skydio X2D will continue moving after lifting your finger from the screen

- the farther you move the slider in either direction, the faster Skydio X2D will orbit
- using the joystick, the drone will move only while joystick inputs are active
- when the joystick is placed back in the center position, the drone will stop moving and the on-screen slider will snap back to the center
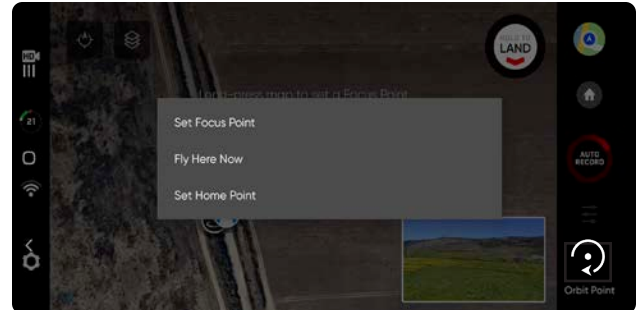
Step 8 - Select **View**

- toggle between the map view and live view
- control camera gimbal pitch and zoom using the controller wheel
- adjust orbit range and altitude
- drag the orbit on the controller screen to increase or decrease the orbit range
- manually pilot X2D and the orbit range will dynamically adjust

Step 9 - Pause the orbit, manually pilot the drone to a new position, then resume

Step 10 - Adjust Focus Point

- tap and hold on the map and select **Move Focus Point**
- replaces the current focus point and sets the new orbit radius to match the drone's current location
- this will stop the current autonomous action allowing you to take manual control

To Pause Autonomous Flight - select the Stop button

- this will stop the current autonomous action allowing you to take manual control

Flight

Track in Place

To visually track a subject, select the Track in Place skill, identify a subject of interest, then fly the drone to within 100 ft (30 m) if your subject is a person or 140 ft (40 m) if your subject is a vehicle so that Skydio X2 can detect it.

Select the subject indicator to start tracking a subject

- X2 will autonomously rotate and tilt the camera to track the subject as it moves

Use the controller joystick to control the height and lateral movements

- lateral movement speed limited to 4 mph (6.4 km/h)

X2 will remain visually locked onto a tracked subject up to a distance of:

- person – 800 feet (240 meters)
- vehicle 1,000 feet (300 meters)

Tracking will continue until the subject is too far away or blocked by an obstruction.

Subject indicator
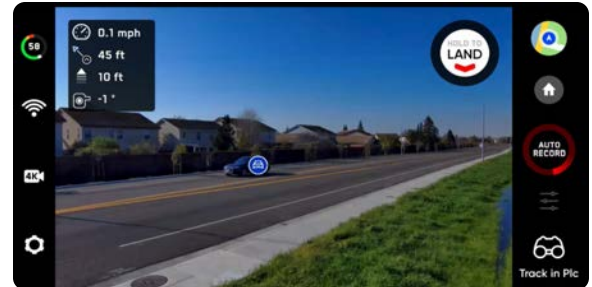
The subject indicators represent a person or vehicle that is available for tracking. When in the Track skill, tapping the indicator will command X2 to enter autonomous flight mode with the selected object as the tracking subject. For best tracking performance:

- track one person or vehicle at a time. Skydio X2 does not track pets or animals.
- to be available for track the subject must be visible on the Fly screen
- if the subject indicator does not display, fly closer and ensure that the subject is framed in the center of screen

Zoom-in while Tracking Subject

Provides a clear and enlarged view of the individual or vehicle being tracked. Allows you to start tracking a subject and digitally zoom-in 3x

Flight

Waypoints

The Waypoints skill allows you to design and execute multi-waypoint GPS missions. Skydio X2D uses AI-enabled path planning algorithms to avoid obstacles. To create a mission:

Step 1 - Select **Waypoints** from the skills menu

Step 2 - Select map view

Step 3 - Long-press anywhere on the map

Step 4 - Select **Add Waypoint** to set the first waypoint

- The first waypoint will automatically be the current position of X2

Step 5 - Customize settings by selecting the newly created waypoint

- Set the altitude, heading, and camera angle for that waypoint

Step 6 - Long-press on the map to set your second waypoint

Step 7 - Continue to add waypoints until your path is complete

- Missions can support up to 256 waypoints.
- Waypoints that are added while a mission is in progress will be included in the current mission
- If a waypoint is added after a mission is complete, the flight will restart before including the newly added waypoint
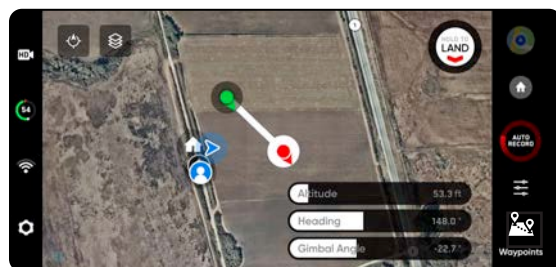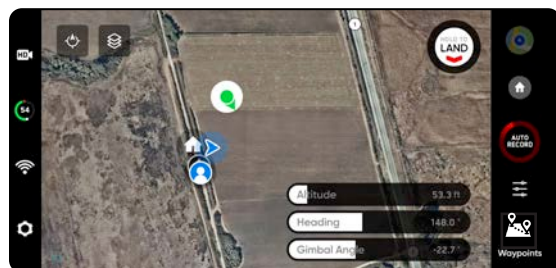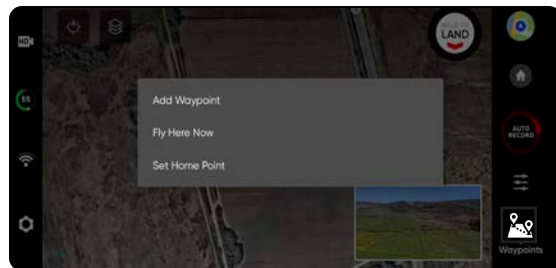
> **NOTE:** *Waypoints are created using GPS coordinates. Skydio X2D must have a good GPS signal prior to executing a waypoint mission.*

Step 1 - Select **Play** to start the mission and Skydio X2D will autonomously move through each waypoint.

- Only one waypoint mission may be defined at a time
- You cannot save and load between multiple missions
- When the mission is complete X2D will hover in place
- Waypoint missions are stored on the controller and will persist across flights and reboots

Step 2 - Delete a waypoint

- Long-press and select **Delete**

Step 3 - Clear all waypoints

- Select the trash icon

Flight

Waypoints

Adjust the Waypoint settings menu to further customize the mission behavior.

Speed – set the speed at which Skydio X2D will move between waypoints.

Lost Comms – defines the lost link protocol if the signal connection to the controller is disrupted during a mission:

- Return to Home (default)
- Continue the mission
- If X2D does not regain connection after continuing and completing the mission it will return home

Photo at Waypoint – Set to take a photo at each waypoint

- When resuming a mission video mode will automatically switch to photo mode. The drone will switch back into Video mode upon pausing a mission, completing a mission, or exiting the Waypoints skill.
- If you switch to Video mode while a mission is active the drone will automatically switch back to Photo mode at each waypoint, capture the image, then switch back to Video mode. This will result in a separate video file for each flight segment between waypoints.
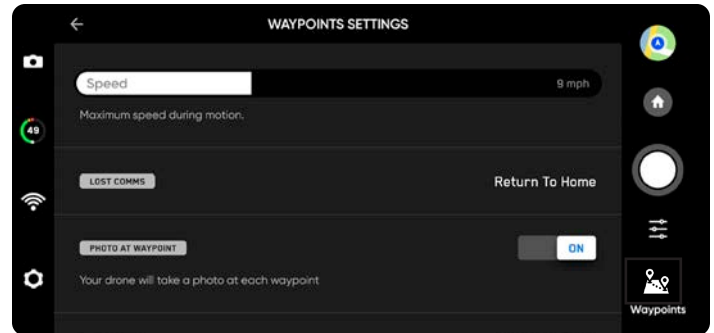
> 📝 **NOTE:** *Waypoint missions are stored on the controller, however the skill settings for the mission are stored on X2D. If you run the same mission with different vehicles, set your Waypoint skill settings for each X2D*

Flight

KeyFrame

Use the KeyFrame skill to create cinematic aerial shots by capturing continuous, complex video with smooth camera motion. KeyFrame flights can be flown repeatedly, with varying degrees of complexity, subtle camera moves, speed adjustments, and obstacle avoidance. Set up your sequence by adding up to 100 keyframes in 3D space. KeyFrame uses the visual navigation system and does not rely on GPS. To use KeyFrame:

Step 1 - Select the **Cinematic** tab from the skills menu

Step 2 - Select **KeyFrame**

Step 3 - Fly to your first keyFrame location

- Adjust the drone and camera position
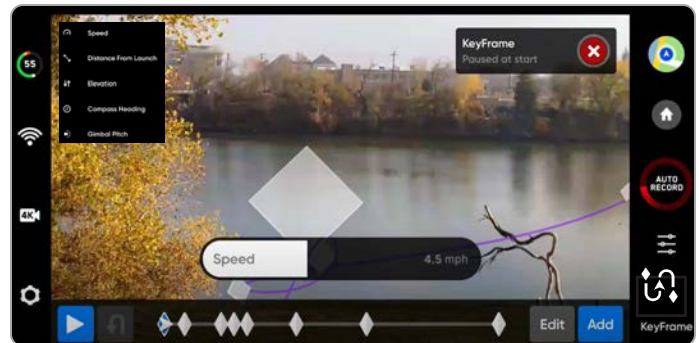
> **NOTE:** *Placing your initial keyframe close to your Launch Point will improve the accuracy of your flight path. KeyFrame paths set far away from your launch point may be less accurate.*

Step 4 - Select **Add** to lock in the keyframe location and position

- Add up to 100 keyframes
- KeyFrames are automatically saved

Step 5 - Select **Done** when you have completed your sequence

Step 6 - Select **Play** to fly

Step 7 - Adjust the speed at which the drone will fly to each keyframe

X2D will begin at the last KeyFrame added and fly through your sequence along the spline until it reaches the first KeyFrame added.

- **Edit** or **Add** KeyFrames to your sequence along the spline at anytime
- Press the red X button in the top right to return to the Manual flight skill
- KeyFrames will automatically be saved

Adjust the KeyFrame settings by selecting the Skills setting icon

Playback Style - manually adjust the camera roll along the flight path while flying

Recorded - will playback the KeyFrame sequence using the gimbal roll you set up at each point

Free Look - allows for manual control of the gimbal roll using the Enterprise Controller right wheel

Speed - adjust speed X2 will not fly the exact same path at two different speeds

- The vehicle will dynamically slow down to 11 mph (5 m/s) around sharp turns, allowing you to increase the maximum speed without sacrificing accuracy

On-Screen Controls - toggle On to display the slider to adjust the gimbal roll from -35° to 35°

Joystick Control -

- Absolute – roll joystick input directly maps to drone movements. X2 will stop when the joystick is centered
- Relative – roll joystick input increases or decreases speed. The current speed is maintained when the joystick is centered

Flight

Scout

Scout flight skill simplifies the tracking of moving subjects to offer real-time situational awareness. Scout allows you to track and follow a GPS position at long range, with the ability to adjust and reposition your drone on the fly. Skydio Scout supports GPS tracking of the Skydio Enterprise Controller or Skydio Beacon.
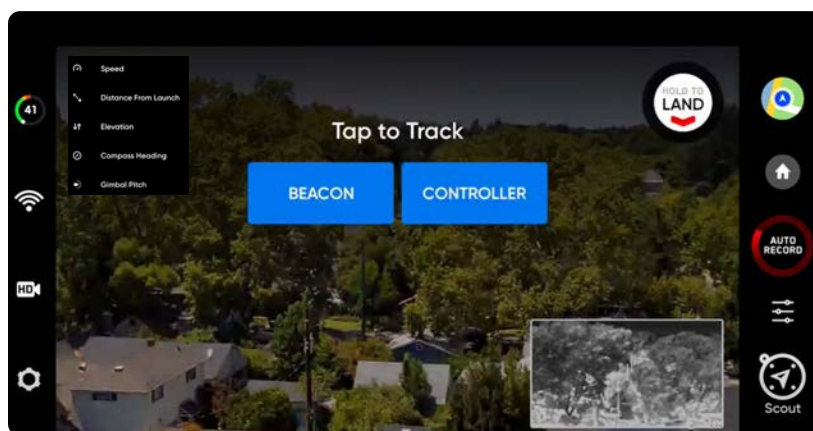
To initiate Scout:

    Step 1 - Select **Begin Flight** and launch

    Step 2 - Select Scout from the skills menu

    Step 3 - Tap to track:

- **Skydio Enterprise Controller** *OR*
- **Skydio Beacon** - will only display if the X2 is connected to the Beacon

Skydio Beacon

Skydio Beacon is used as a GPS tracking device with limited manual steering capabilities, the ability to start and stop Scout, and Return to Home. You have the option to lock Beacon controls to mount Beacon on a moving subject without the risk of unwanted button inputs.

Pair Skydio Beacon (optional):

- Power on Skydio X2
- Power on Skydio Beacon - press and hold the Skydio logo button for three seconds
- Connect Beacon to the drone using the USB-C cable
- Successful connection will display Connected to Skydio-XXXX

Lock Beacon Controls (default)

- To disable, select the Device settings menu and the Beacon tab
- Unlocking Beacon is persistent across flights but not power cycles

Flight

Scout Settings

Adjust Skydio Scout setting by selecting the skills setting icon

Ignore Subject Height -

- Disabled (default) – the drone will incorporate the vertical changes in altitude of the tracked GPS position
- Enabled – the drone will ignore the vertical changes in altitude of the tracked GPS position and maintain the set altitude unless the pilot commands the throttle

Positioning Behavior -
Set the drone's behavior to automatically reposition itself to match changes in the subject's direction of motion, the drone will maintain its position relative to the tracked Skydio Enterprise Controller or Beacon.

- Relative – X2 will stay at a constant angle relative to the direction of motion of the tracked GPS
- Fixed – X2 will stay at a constant angle relative to the world

Poor GPS Behavior - select what your X2 will do if it encounters a weak GPS signal:

- Cancel Tracking X2 will stop tracking
- Wait for GPS (default) X2 will hover until tracked GPS is regained

Range Limit - toggle on (default) or off, the slider allows you to choose a maximum range the drone can fly

Maximum Range -

- 33 ft (10 m) to 1969 feet (600 m)
- Default maximum range value is 246 ft (75 m)
- Skydio X2 can not manually fly or track past the maximum range
- If the inflight position is beyond the Maximum Range value, X2 will attempt to fly towards the tracked subject at 22 mph (10 m/s) until it is within 33 feet (10 meters) of the Maximum Range and slow until it is within range

Automatically track Beacon -

- Toggle on, and X2 will automatically start tracking Beacon when the Scout skill is selected and there is a strong GPS signal

Show subject in AR - toggle on (default) and the AR marker will display over the tracked subject. This allows the operator to more easily orient themselves to the tracked GPS subject while in flight.

- The AR Marker is red when the drone is close to the GPS subject and purple when it is furthest away
- The AR marker displays above the tracked subject at the height of the drone
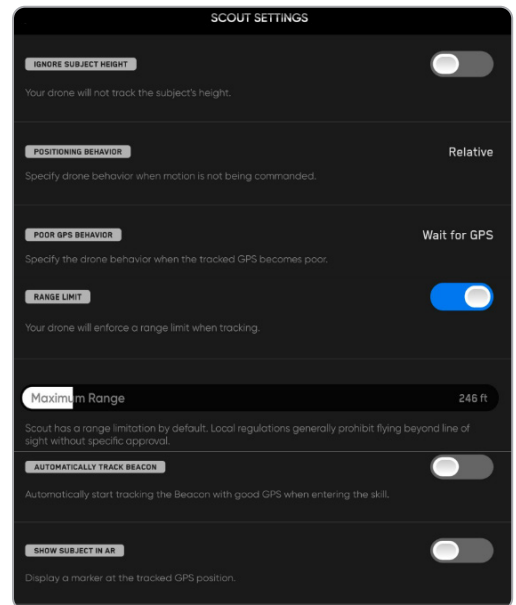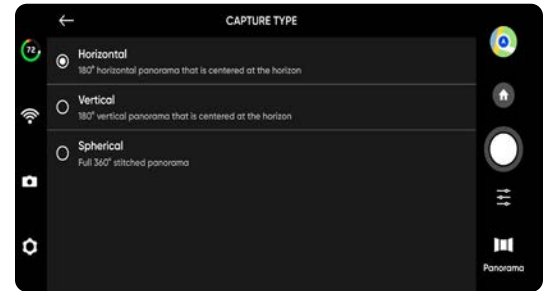
Flight

Panorama

The Panorama skill allows you to take three different types of panoramic photos:

- **Horizonta**l - captures a 180° horizontal panorama
- **Vertical** - captures a full 180° degree vertical panorama
- **Spherica**l - captures a full 360° degree equirectangular image

To capture panorama images:

    Step 1 - Select **Begin Flight** and launch

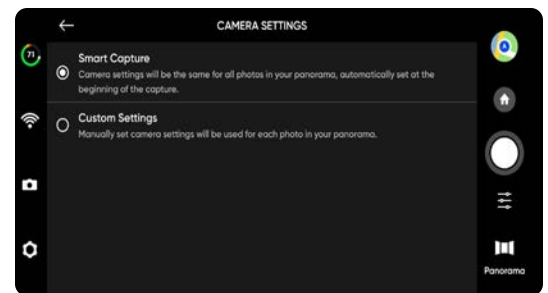   **Step 2** - Select **Panorama** from the skills menu

    Step 3 - Select **Capture Type**

    Step 4 - Open the Skill Settings and select the **Camera Type**

   **Step 5** - Use **Panorama Live Preview** to frame the shot

- The camera feed will display a low-resolution live preview
- Fly to your desired location and adjust the roll, pitch, yaw and throttle to encompass the scene

Flight

GPS Night Flight

Enable GPS Night Flight when flying in low-light conditions. When in this mode, Skydio X2D will disable obstacle avoidance and use GPS sensors, instead of its vision system, to navigate. Skydio X2D will display an alert message if the environment is too dark to fly using the vision navigation system and will prompt you to fly using GPS Night Flight.
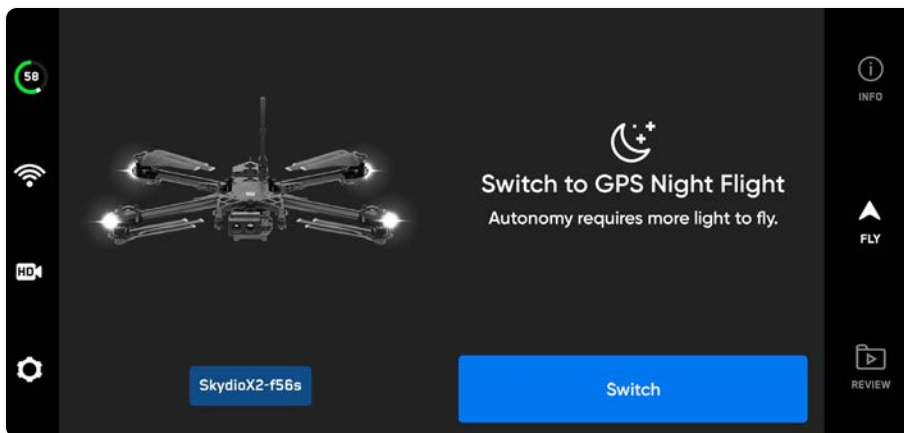
Step 1 - Select Device Settings gear icon

Step 2 - Select the **Drone** tab and scroll down

Step 3 - Select **GPS Night Flight** and toggle on

Step 4 - Select Lights

- Toggle on RGB navigation, Infrared, or Strobe lights
- Infrared and Strobe lights cannot be on at the same time

Step 5 - Complete calibration if required

- See instructions on the next page

Step 6 - Navigate back to the fly screen

Step 7 - Launch Skydio X2D

- X2D will climb to 10 ft while rotating 360° to establish a heading
- Obstacle avoidance will be disabled
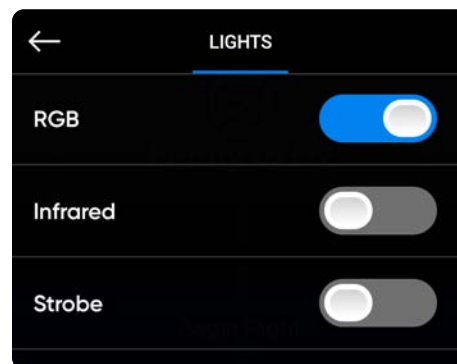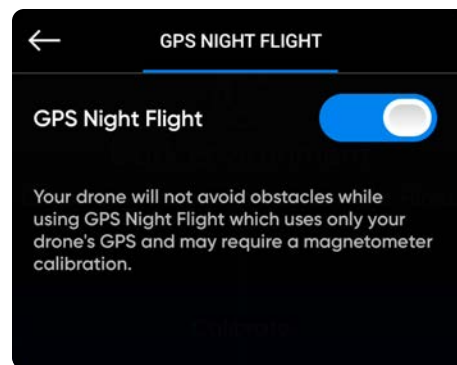
> ⚠️ **WARNING:** *GPS Night Flight mode requires flying without obstacle avoidance. Skydio X2D may drift slightly and oscillate up and down when in GPS Night Flight mode; take extra caution when flying in this mode and do not stand near the vehicle.*

Flight

GPS Night Flight Calibration

If this is your first time enabling GPS Night Flight mode, you will need to complete a calibration before flight. Select your calibration method

- Hand Wave calibration
- Multi-step calibration

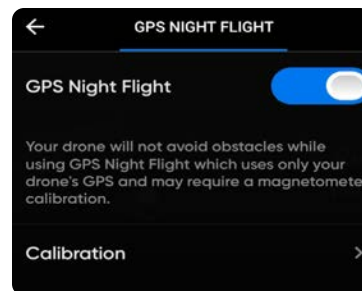**Hand Wave**:

Toggle Hand Wave calibration on

- Select the settings menu
- Select the Drone tab and scroll down
- Select **GPS Night Flight**
- Toggle Hand Wave On
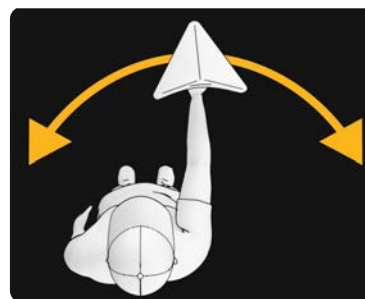
Rotate:

Toggle Hand Wave calibration off

- Rotate X2 to match the orientations as shown by the corresponding animations
- The rotations steps do not need to completed in any particular order
- Select **Done** when all of the calibrations are checked

Flight

GPS Night Flight safety considerations

> ⚠️ **WARNING:** *Obstacle Avoidance is **disabled** in GPS Night Flight. **Do not** hand land or launch in GPS Flight Mode*

Obstacle Avoidance
When GPS Night Flight is enabled, Skydio X2D does not use vision navigation and **Obstacle Avoidance is disabled**. Take extra caution when piloting the vehicle to avoid obstacles and stay clear of people.

Visibility
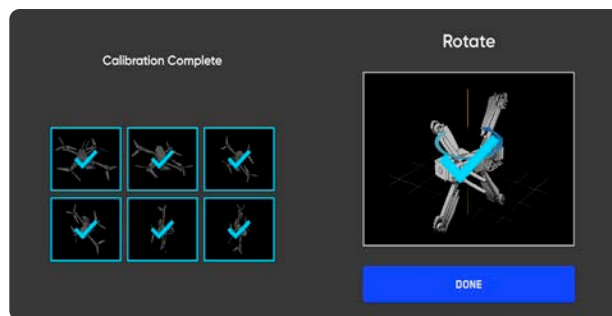Improve visibility by enabling infrared or visible strobe lights. Skydio X2D strobe lights meet the FAA requirement of being visible at a distance of 3 statute miles.

Return behavior
Review the return behavior height setting in the Drone Settings menu. Skydio X2D does not avoid obstacles when in GPS Night Flight mode, so you may want to set the drone's return height such that it will be above any potential obstacles.

Launch and land
When landing, use the controller joystick to descend down to 15 feet (4.6 meters), when you are ready to land, press and hold the LAND button on the screen or the controller.

Flight

Return behaviors

Customize return behaviors in the Drone Settings menu:

Return Type – GPS or Vision

Return Height – from 0 to 984 ft (300 m)

- The default the return height is set to 32 ft (9.7 m) the drone will ascend to that height before returning.

Return Behavior –

- **Absolute return height** – X2 will ascend to the specified Return height (above the launch point) before returning
- **Relative return height** (default) – X2 will ascend by the specified Return Height above the drone's current position before returning.

Drone Looks – X2 will either look toward or away from the return destination

Return Speed – set between 5 and 22 mph

Low Battery – Is only available when you set a Home Point

- **Always Ask** (default) – you will be asked to select a low battery behavior when your drone only has enough battery to return and land
- **Return to Home Point** – the drone will automatically return to the set Home Point adhering to the return settings.

Lost Connection – set lost signal connection behaviors
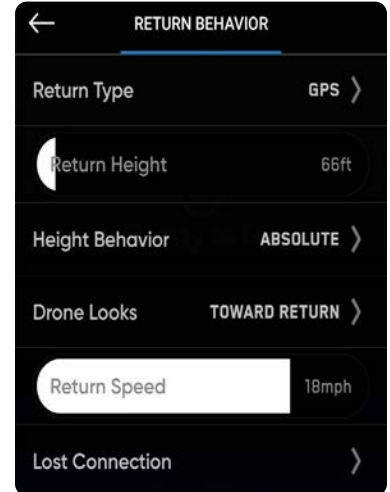
Skydio X2 returns based on Return Type:

	RETURN TYPE = GPS	RETURN TYPE = VISION
Launch Point	GPS to return to launch point	Visual navigation to return to launch point
Phone	GPS to return to controller location	Not supported in visual navigation. X2 will use GPS to return to controller location
Home Point	GPS to return to home point	Not supported in visual navigation. X2 will use GPS to return to home point
Fly Here Now	GPS to fly to specified location	Not supported in visual navigation. X2 will use GPS to fly to specified location
Low Battery	GPS to fly to the Home Point or specified location	Not supported in visual navigation. X2 will use GPS to fly to the Home Point or specified location

> **NOTE:** If the return type is set to GPS but the Skydio X2 enters a GPS denied situation your drone will return to the last known GPS point using vision navigation. If a GPS link is not re-established your drone will return to the launch point using vision navigation.

Flight

Return location 🏠

Your return location options include, Launch Point, Home Point, or the controller (default). Your return flight will use either GPS or the vision navigation system. Visual return will only work with the Launch Point. Setting a Home Point or returning to your controller location will require GPS.

To set a Home Point:

Step 1 - Select the **Device settings** menu

Step 2 - Select the **Drone** tab

Step 3 - Select **Return Behavior**

Step 4 - Set **Return Type** to **GPS**

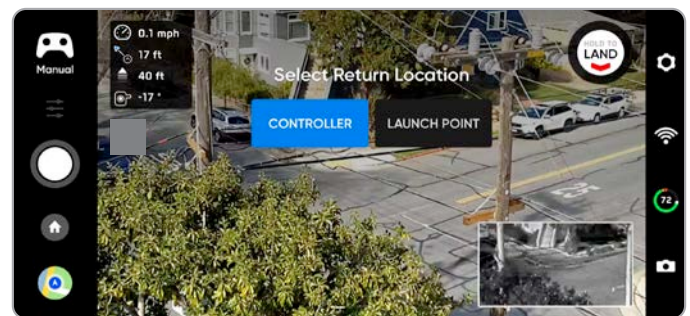- GPS is required to return to the **Controller or Home Point**

Step 5 - Select the **Map** icon

Step 6 - Long-press a point on the map

- Tap to move and delete an existing Home Point

Step 7 - Return to the Fly screen and select the **Home** icon

- Set return to Home Point
- If a Home Point has been set for this flight, Launch Point will be replaced with Home Point

> 📝 **NOTE:** *setting a Home Point is only available during the day, you cannot set a Home Point at night. Ensure that there are no obstacles (e.g., people, animals, etc.) in the drone's return pathway. Skydio X2 will retain its current obstacle avoidance setting when returning.*

Flight

Land

When you are ready to land your drone, stop any subject tracking or autonomous actions and manually fly the drone to a stable landing spot that is clear of debris and people.

Step 1 - Descend to 15 ft (4.6 m)

Step 2 - Select and hold Land

- Skydio X2D will descend

- Below 10 ft (3 m) obstacle avoidance will be disabled for the remainder of the landing

- During landing you may nudge the drone forward, backward, left, or right

- Yaw control is disabled during landing

- Cancel the landing by increasing altitude or selecting Cancel Landing

Case landing

Use the case for a landing pad to avoid disturbing dirt and debris:

Step 1 - Position the drone about 10 ft (3 m) above the case

Step 2 - Tilt the camera down so the case and Skydio logo are clearly in view

Step 3 - Select and hold Land

- a yellow ring will circle the Skydio logo

- if you do not see the yellow ring, cancel the landing and try again

> ⚠️ **CAUTION:** Piloting or nudging the vehicle during a case landing will cancel the case landing and continue with a normal landing. Be careful not to accidentally touch the controller joysticks while X2 is performing a case landing.

To reduce the chances of canceling a Case Landing due to an accidental nudge, Skydio will require one second of joystick inputs to unlock from the case. Re-initiate a Case Landing by tapping the blue case icon.

> ℹ️ **INFO**: Skydio X2D may identify bushes, trees, and similar obstacles as potential surfaces. Pilot the drone to an open area free of obstacles before initiating a landing. If a flight is initiated by taking off from a case (or a case is placed at exact launch point), GPS positional accuracy cannot be relied upon to guarantee a case landing when using the Return to Home function (or in the case of a Return To Home triggered by lost communication).

Flight

Hand landing

⚠️ **WARNING:** *Exercise extreme care to avoid injury when attempting to land a drone on your hand. Do not attempt to hand-land before X2D is in a landing state as it may cause severe injury. Attempting to hand-land while obstacle avoidance is active will cause X2D to avoid your hand and crashing into you or surrounding objects. Hand-landing should only be used when surrounding surface conditions are unfavorable. Land on a flat surface when possible. NEVER hand-land when in GPS Night Flight mode, as it may cause severe injury.*

Step 1 - Ensure that:

- Landing conditions are safe, including low winds
- X2D is hovering stationary within a few feet (~1 m)
- X2D is not following a subject
- X2D is over level and stable ground
- You have ample space to physically move yourself beneath the drone

Step 2 - Orient so that the camera faces away from you

Step 3 - Initiate a landing

Step 4 - While X2D is landing, move yourself into a position that will allow X2D to safely land in your hand.

- You will be able to nudge the drone forward, backward, left, or right, however it is best and safest to adjust your position to meet the drone.
- Do not attempt to hand land before obstacle avoidance has been disabled. Obstacle avoidance is disabled when altitude is below 10 ft (3 m). You will be notified when obstacle avoidance is disabled.

Step 5 - After obstacle avoidance has been disabled, allow the drone battery to land gently onto your hand. Grasp the battery on the sides and hold the drone in the same position until the propellers completely stop spinning.

- During landing X2D is verifying that it is supported by a stable surface and motionless for several seconds to ensure that a safe touchdown has been achieved. It may take several seconds to stop the propellers after touch down.
- If X2D is not level and motionless, the propellers may start spinning again. If this happens, maintain a firm grip on the battery and keep the vehicle stable and motionless.
- Do not attempt to rotate or flip the vehicle during a hand landing. Doing so may cause the battery to become dislodged.

Only use hand landing when absolutely necessary. Do not attempt a hand landing if:

- in GPS Night Flight mode
- the wind is strong
- X2D is not stable in flight for any reason
- X2D is performing an emergency landing after an accident or crash
- you are in an area where you do not have stable footing
- you are on a moving vehicle or boat
- you are not an experienced pilot

Post-flight

Reviewing and offloading media
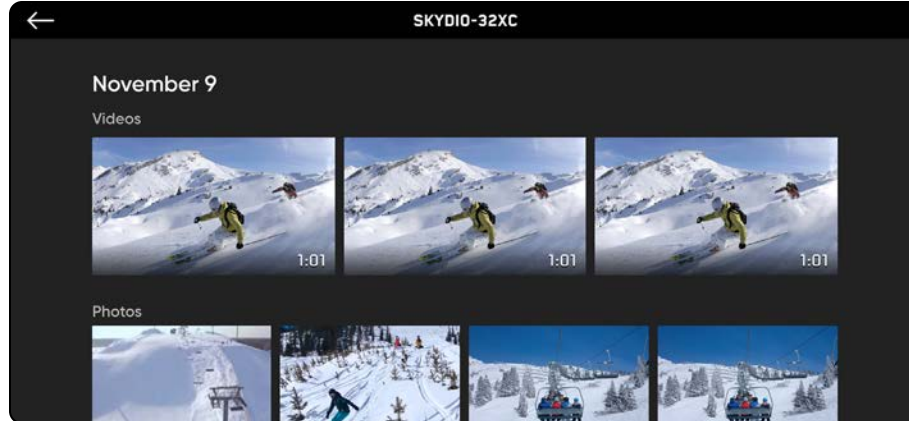
To view the images and videos captured:

    Step 1 - Select the Review tab

    Step 2 - Select an image or video to review it

       • Interval photo mode - all photos captured will appear as a single stack of photos. Selecting the stack will allow you to scroll through individual images one by one.

       • Only the JPG files will display

To transfer your media to your computer:

    Step 1 - Power on your Skydio X2

    Step 2 - Connect X2 to your computer using the provided USB-C cable

    Step 3 - Import your media

          Windows - your Skydio X2 will serve as an external hard drive

          Apple - use the Photos app or the Image Capture app to transfer

       • Download the DNG image files directly from the SD memory card

       • Images contain embedded EXIF data to enable post-flight analysis

To delete media:

    Step 1 - Press and hold the image or video to enter selection mode

    Step 2 - Select your desired media

    Step 3 - Select delete

> ℹ️ **INFO**: *Connecting via USB to a computer that does not supply charging power will cause Skydio X2D to run off of battery power and may drain the battery.*

Post-flight

Reviewing and offloading media

If Encryption was Enabled for your flight, your encrypted media will not display in the Review tab.
To review your encrypted media, power on the vehicle and insert the Encryption Fob into the vehicle. When the lights on the fob stop flashing, your encrypted media will be visible in the app for you to review.
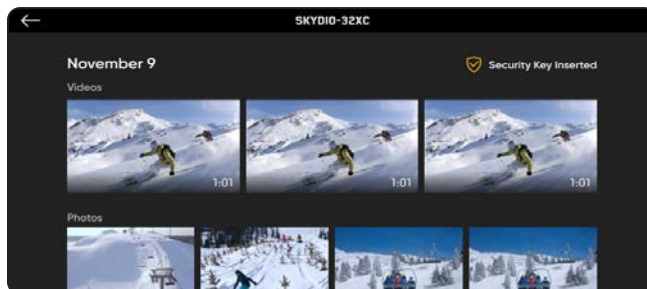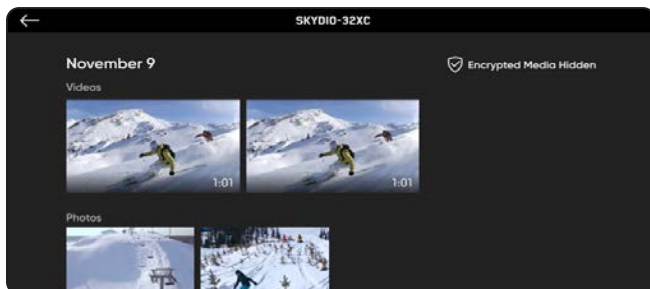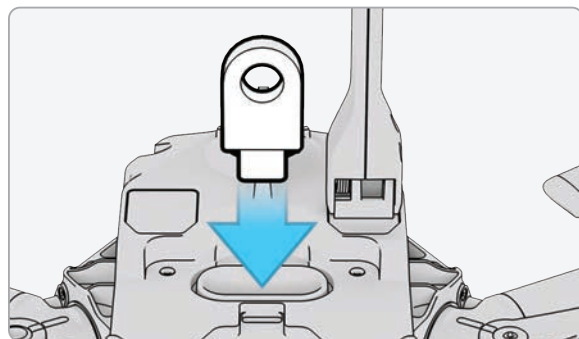

To review and copy your encrypted media on your device:

Step 1 – Power on the vehicle

Step 2 – Insert the fob into the USB-C port on the vehicle

- This will decrypt your media
- Media will stay decrypted until you power off your X2D or begin a new flight
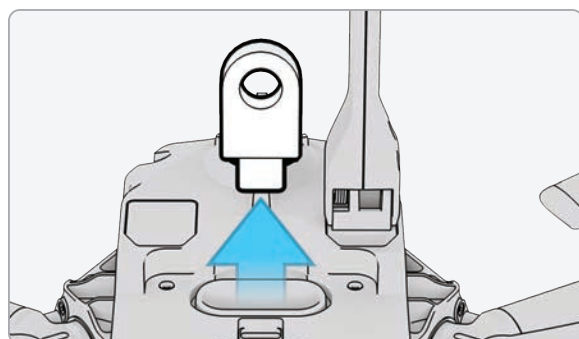- Reinsert the fob to decrypt your media again

Step 3 – Remove the key

- When the lights on the fob stop flashing

Step 4 – connect the vehicle to a computer using a USB-C cable

- Import your decrypted media
- Decrypted media will remain decrypted

> ⓘ **INFO**: *Windows computer, your Skydio X2D will serve as an external drive. For Mac, use the Photos app to transfer your footage to your desired location (the Photos app is included with any current Mac, or are available from the macOS App Store). You will not be able to use the Image Capture app on Mac to import your decrypted media.*
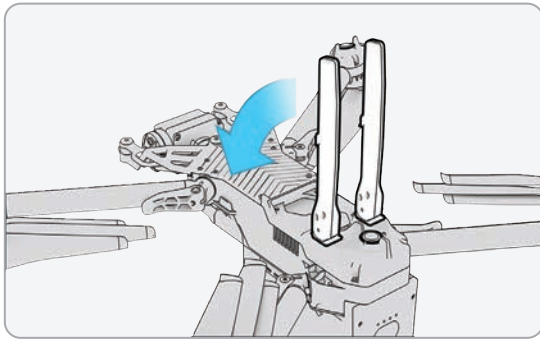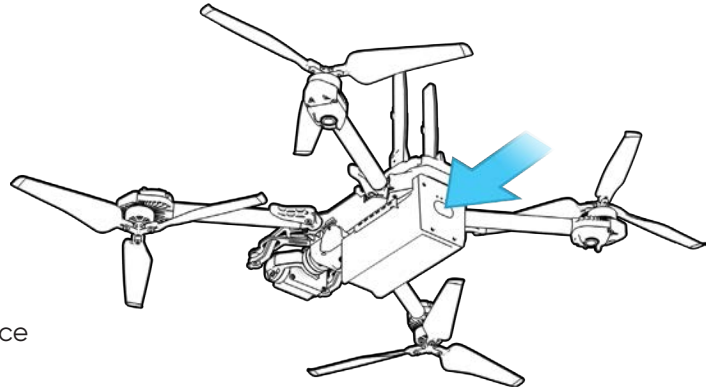
Post-flight

Dismantle Skydio X2D

Step 1 – Power off Skydio X2D

- Press and hold the battery button for three seconds

Step 2 – Power off Skydio Enterprise Controller

- Press and hold the power button for three seconds
- Select Power Off

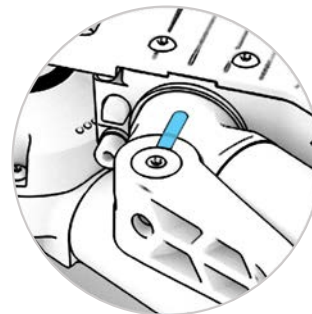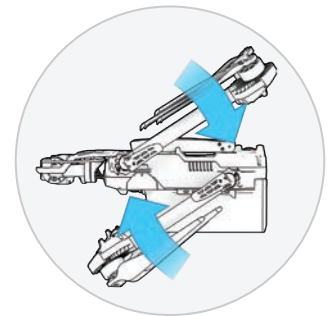**Step 3** – Gently push in and down antenna(s) to lock in place

Step 4 – Release the 4 arm clamps

Step 5 – Lift the motor arms and fold in towards the body

- If you feel any resistance when opening the arms, push outward (horizontally) on the arm to unseat

Step 6 – Return the 4 arm clamps to the locked position

- Ensure that the blue marks align

⚠️ **WARNING:** *Propeller blades are sharp. Handle with care.*

Emergency Behaviors

Lost Connection

If Skydio X2D loses connection to the Skydio Enterprise Controller during flight, it will return to the Launch Point, or the Home Point if one was created. Establishing lost signal connection return behaviors is a critical component in pre-flight planning to ensure that your Skydio X2D returns safely and lands in an accessible location.

Return when Disconnected – toggle Off to disable Return when Disconnected and the Lost Connection menu. X2D will not return if it loses connection—it will hover until it reaches low battery and land.

Wait before Return – specify the amount of time that you want X2D to wait before it initiates a return flight, allowing time to reconnect.

Land Once Returned –

- Enabled (default): X2D will return, hover for a specified amount of time, and then land
- Disabled: X2D will hover in place until it runs out of battery

Wait Before Land – specify the amount of time between that you want X2D to wait before landing.

- 0 to 300 seconds (default – 240 seconds)
- Only available when Land Once Return is toggled on

Lost GPS

Skydio X2D loses GPS

- In the event that the GPS signal is lost, the drone will continue flying as normal. You will still be able to Return Home and fly to waypoints, however the flight will be less accurate. If Skydio X2D loses GPS for an extended period of time, actions that require GPS (Return to Home/Controller, fly to a waypoint, Waypoint missions) will be disabled.

- When Skydio X2D is flying at high altitude or over large bodies of water, visual positioning becomes more difficult and the drone relies on GPS to assist with lateral positioning. In the event that GPS is lost in such conditions, lateral positioning will be affected and the drone may initiate an emergency landing.

Skydio X2D loses GPS during Waypoint Mission

- X2D will attempt to fly to each waypoint, but may experience some location inaccuracies. At the final waypoint a GPS Lost alert message will display. Manually pilot the drone and attempt to regain a GPS signal and restart the mission.

Skydio X2D loses GPS during GPS Night Flight

- If Skydio X2D loses GPS while in GPS Night Flight mode, it will initiate an emergency landing.

Skydio X2 never had GPS

- If Skydio X2D never obtains a strong GPS signal, you may not be able to set a Home Point, fly to a waypoint, or return to Controller/Home. If your Return Type is set to Vision, however, you will be able to reliably return to the Launch Point using the vision navigation system.

Find Drone

If the Map Coordinate setting is enabled the coordinates of the current or last known location are available making it easier for you to locate your lost drone:

Step 1 – Select the **INFO** menu

Step 2 – Select your device name

Step 3 – Select **Find Drone**

Emergency Behaviors

Low battery

When Skydio X2D battery is low, there will be a series of notifications and actions to ensure a safe landing:

- X2D will assess your altitude and distance from the Home Point, and warn you when it is time to return home. It is recommended that you initiate a return or land at this time, however you can choose to keep flying.
- X2D will then notify you when it has 2 minutes of flight time left based on its current altitude and the battery indicator will begin a two-minute countdown. You may choose to continue flying, however it is strongly recommended that you fly to a safe location and land.
- When the two-minute countdown is complete, X2D will initiate an automatic landing that you will be unable to cancel. You will maintain the ability to nudge the drone in roll, pitch, and yaw to avoid any obstacles.

Emergency landing

If X2D enters an unexpected state that it cannot recover from, it will automatically initiate an emergency landing. An alert notification will display that X2D is initiating an emergency landing.

- X2D will try to use the navigation cameras and GPS system to descend vertically. If these are not available, the vehicle will descend quickly using only the barometer which may result in lateral drift.
- If the emergency has been resolved X2D will stop emergency landing and you will regain control of the drone.

View Last Flight

Designed to assist with locating your drone in the event of a crash, emergency landing, or low battery landing in an unintended location. Review the video of your 10 most recent flights, even when your phone or controller is not connected to X2D.

Step 1 - Select the **INFO** menu

Step 2 - Select your vehicle

Step 3 - Select **View last Flights**

Step 4 - Select a flight to review the video

To export the videos

 Step 1 - Insert a USB-C memory drive into your Enterprise Controller

- the memory drive must be formatted in **ExFAT**

 Step 2 - Select **Export**

Emergency Flight Termination

Terminate your flight in the event of an extreme emergency. Simultaneously press and hold the Land and Return buttons for three seconds while in flight to immediately stop your drone's motors.

> ⚠️ **WARNING:** *Terminating a flight will cause your drone to crash. Damage resulting from Flight Termination is not covered under warranty and may result in injury or damage.* ***Use only in extreme situations****.*

Maintenance

Battery safety guidelines

Skydio X2D uses rechargeable lithium polymer batteries (LiPo).

- Charge your Skydio X2D batteries using only the Skydio supplied charging power adapter or dual charger accessory (dual charger sold separately). We recommend using the provided power adapter; however, most USB-C power adapters that are rated from 40W up to 100W should be compatible as well (charge time may be affected when using non-Skydio chargers).

- While charging, the Skydio X2D or X2D Dual Charger should be in an open area as it is normal for the device to become warm to the touch.

- TSA and FAA guidelines state that spare (uninstalled) lithium batteries must be transported in carry-on baggage only. When traveling with Skydio X2D in the United States, be sure to pack your batteries in your carry-on luggage only. For more info, please see this FAA page. When traveling with Skydio X2D outside of the United States, be sure to check local regulations before transporting batteries.

- Do not use your Skydio X2D batteries at temperatures below 14°F (-10°C), as they will not function properly below that temperature. If your batteries do get cold, warm them up in a room-temperature environment - DO NOT use higher heat (hairdryer, etc.) to accelerate heating.

- Do not charge your batteries when ambient temperature is above 95°F (35°C) or below 50°F (10°C). Batteries will not charge when too hot or too cold.

- If storing your batteries long-term, we recommend fully charging and discharging them every two months. Store batteries at room temperature 71°F - 82°F 22°C - 28°C) and away from any moisture (less than 75% relative humidity).

- Battery idle state: If the battery is above 60% state of charge, after 14 days of idle time (no flights) it will start to self-discharge down to 60%. This self-discharge helps retain capacity over the life of the battery and may take several days to complete. It is normal for the battery to be slightly warm during this discharge process. Charge your battery as you would normally to exit this idle state.

- Do not disassemble the batteries, power adapter, or dual charging docks. Do not strike the battery with high force.

- Do not use any batteries which have become dented or begin to split apart (after a crash or drop).

- Do not immerse the batteries, charger, or charging docks in water or other liquids.

- Lithium polymer batteries can leak, overheat, melt, release harmful gas, burst or ignite when exposed to heat, water, and other liquids or when pierced, punctured or ruptured.

- If any substances from the battery pack get into your eyes, do not rub them. Seek medical attention immediately.

- Take care when disposing of the battery pack. Contact your local waste facility to verify if lithium polymer batteries are permitted in your regular waste. Many stores also offer free recycling.

- Never insert any other materials into the Skydio X2D battery terminals.

Maintenance

Arm clamps

If during your pre-flight inspection you observe that the arm clamps on Skydio X2D are not tight, you should inspect and tighten the tension bolts on the clamps. This process involves loosening and tightening the tension bolt set screws.

1. Tension bolt set screw
2. Tension bolt
3. Torque driver
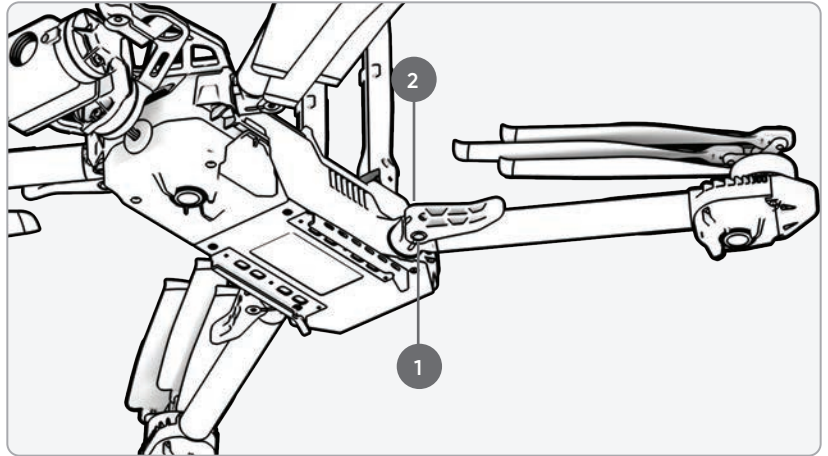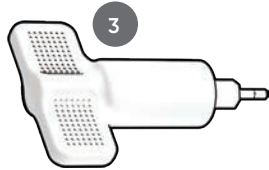
> ⚠️ **WARNING:** *Do not lubricate any of the hinges on your X2D arm, even if they squeak. Doing so may compromise the position of the arms when in flight, resulting in erratic flight and possible collision.*

Extend the motor arm:

Step 1 - Open the arm clamp located at the base of the arm

Step 2 - Lift the arm out and away from the body of the vehicle and rotate 180°

- Listen and feel for a click when the motor arm are fully extended

Step 3 - Fold the arm clamp to the locked position on the arm

- Ensure that the blue marks align
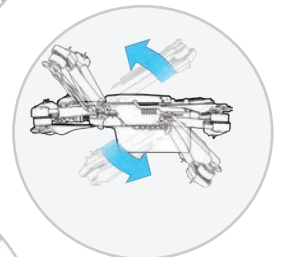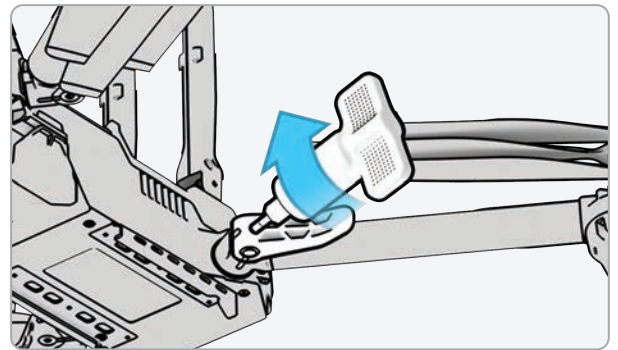
Maintenance

Arm clamps

Step 4 - Loosen the tension bolt set screw

- On the arm clamp tension bolt using the torque driver
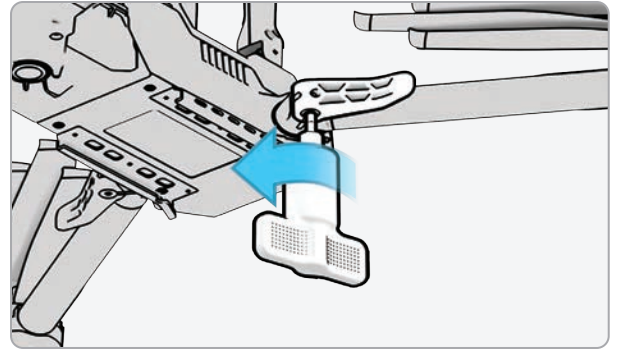
Step 5 - Tighten the tension bolt

- Using the torque driver
- Turn the driver clockwise until you hear a click indicating the desired torque level has been achieved

Step 6 - Tighten the tension bolt set screw

- Turn the torque driver clockwise until you hear a click indicating the desired torque level has been achieved
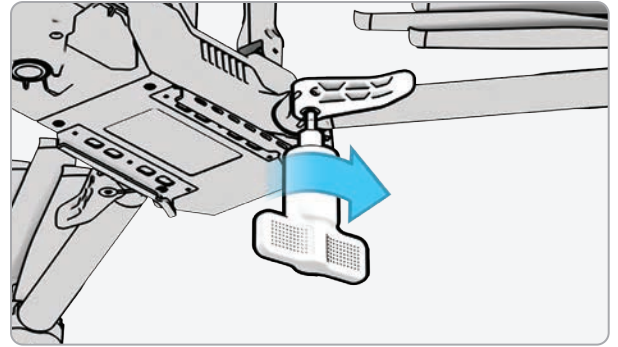
Step 7 - Repeat steps 1–6 on the remaining arms

Maintenance

Replace propeller blades

If you purchased the Skydio X2D Propeller Kit or an X2D bundle, you received the equipment necessary to replace your propellers:

- even dot pattern props (6)
- odd dot pattern props (6)
- replacement propeller screws (12)
- torque driver tool that is included with your Skydio X2D
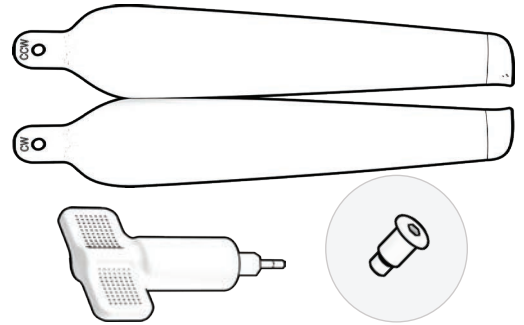
For optimal performance, Skydio recommends replacing your propellers after **100 hours** of flight time or if they are damaged. **Always replace all three propellers in the hub.** Replacing all three propellers will reduce any potential variation between the propellers and track propeller flight time.

> ⚠️ **WARNING:** *Propellers with hairline cracks or large breaks, chops, or bends should be replaced immediately. Do NOT fly the X2D with propellers that are not in good condition as serious bodily harm or injury may occur.*

Step 1 – Identify the damaged propeller

Step 2 – Hold onto the motor or the propeller hub to stabilize the motor
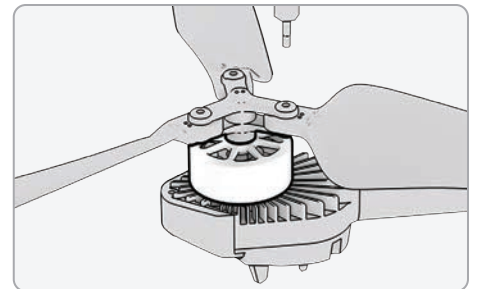
Step 3 – Unscrew the propeller pin using the Torque driver

- Slide the propeller out of the propeller hub, then repeat with the remaining two propellers in the hub
- Replace all three propellers in that hub. All three replacement propellers must come from the same replacement kit
- Dispose of the removed propellers
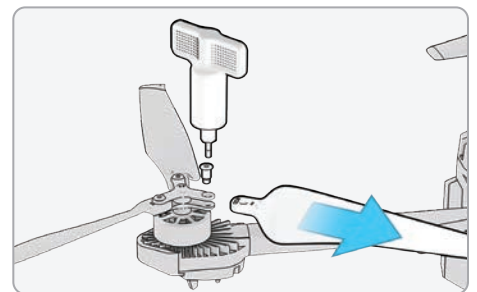
> ⚠️ **WARNING:** *Propeller blades are sharp. Handle with care. Always ensure X2D is turned off before replacing the propellers to avoid injury. Do NOT attempt to replace the propellers while the Skydio X2D is powered on. Doing so is an extreme safety risk and may lead to serious bodily harm or injury.*

Maintenance

Replace propeller blades

Step 4 - Identify the propeller blade markings that match the propeller hub

Step 5 - Install the propeller with matching marks facing upward

Step 6 - Ensure that the propellers are oriented in the correct direction clockwise or counter-clockwise

- Located on both sides of the propeller blades are distinct markings

- Find the markings that match the propeller hub and install with the markings facing upward, to ensures that the propeller are in the correct direction (clockwise or counter-clockwise) and orientation.
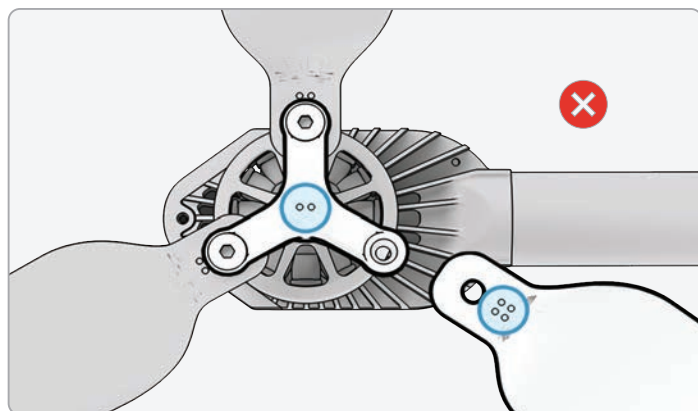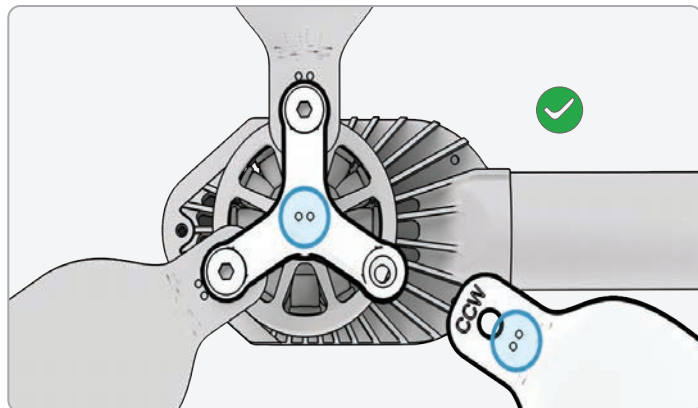

Step 7 - Slide the new propeller into the hub

Step 8 - Insert a new screw from your replacement kit

- Wiggle the screw as you insert the screw to ensure that it seats properly into the hub

- Hold the motor hub to stabilize

Step 9 - Fasten the screw using the torque driver

- Turn clockwise until you hear a click indicating the desired torque level has been achieved
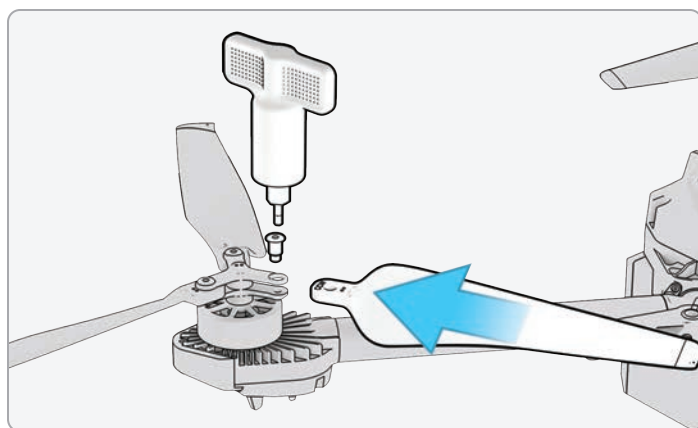

> **INFO:** *Do not reuse screws even if they look to be in good condition. Whenever you replace your X2D propellers, use the new screws provided in your replacement kit.*

Maintenance

Replace propeller blades

Step 10 – Inspect to ensure successful installation:

- Propeller screw threads should extend slightly beyond the bottom of the propeller hub
- Dot patterns match between propeller blades and hub
- Propellers can rotate through full range of motion with minimal friction around the propeller screws and do not bind with the hub spokes
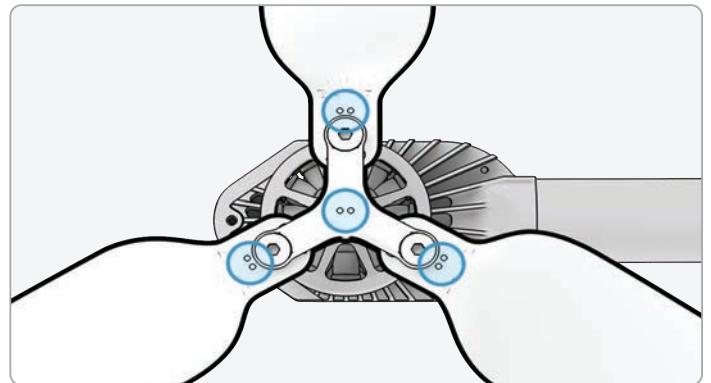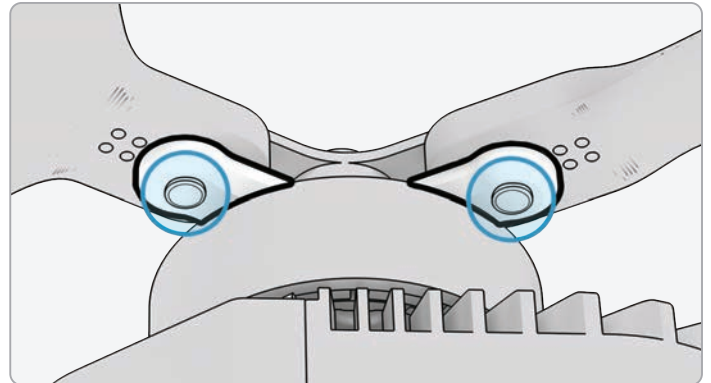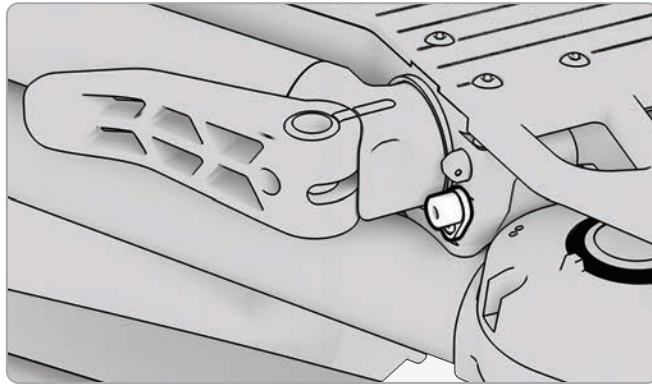

⚠️ **WARNING:** *Incorrect propeller installation (i.e. failure to match the markings on the propeller to those on the hub) is a safety hazard and may result in potential serious damage to the aircraft and serious bodily harm or injury to you and bystanders.*
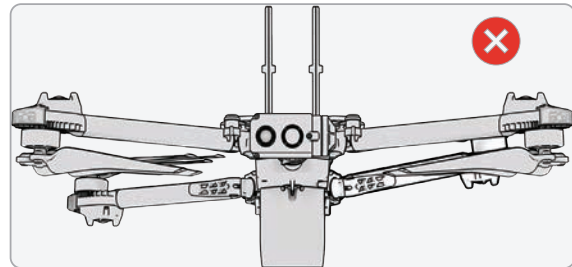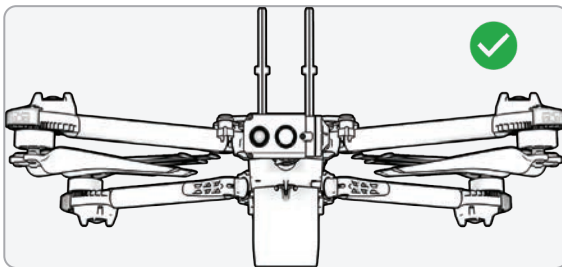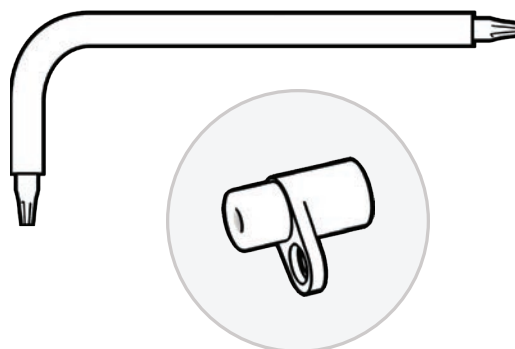
Maintenance

Replace hard stops

The hard stops prevent the motor arms from over-extending when deployed.

Inspect all four hard stops to ensure they are free of damage and working properly. With motor arms extended and viewing the drone head-on, X2D motor arms should be parallel to the chassis. If an arm is angled upward or downward when fully extended, this is an indication that there is a broken hard stop and it should be replaced.

To replace your hard stops, you will need the T3 driver and replacement hard stops.
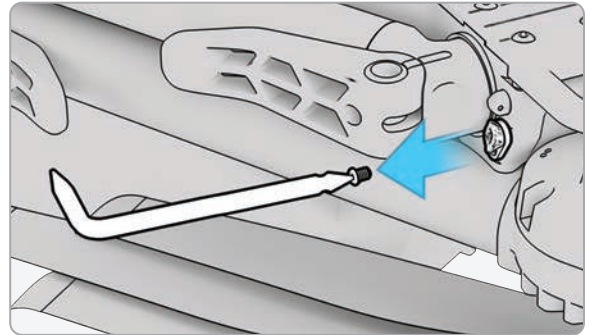
Maintenance

Replace hard stops

Step 1 - Identify the damaged hard stop

Step 2 - Remove the damaged hard stop(s)

- Extend the arm that is either above or below the arm with the damaged hard stop

- Leave the arm with the damaged hard stop folded in

- Loosen the hard stop screw using the T3 driver

- Remove the screw

- Rotate the hard stop so the flange protrudes from the drone
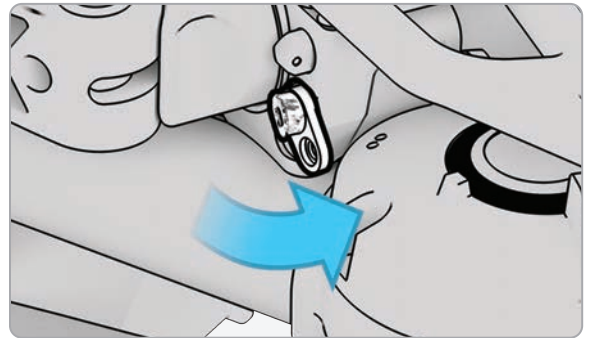
- Grab the hard stop by the flange and pull out to remove - rotate the hard stop back and forth to dislodge it from the drone

Maintenance

Replace hard stops

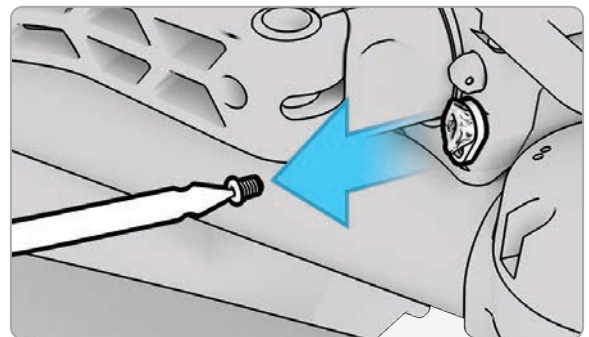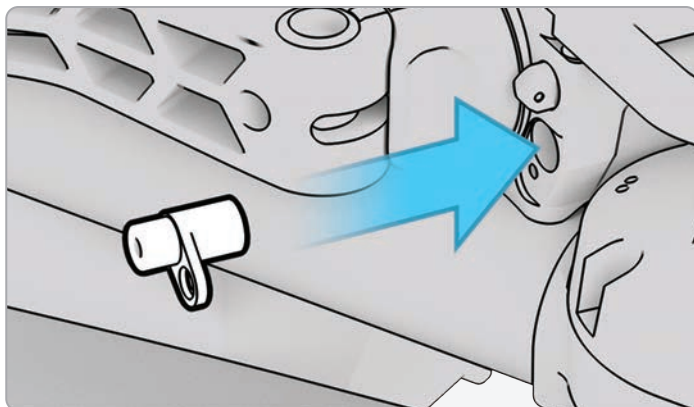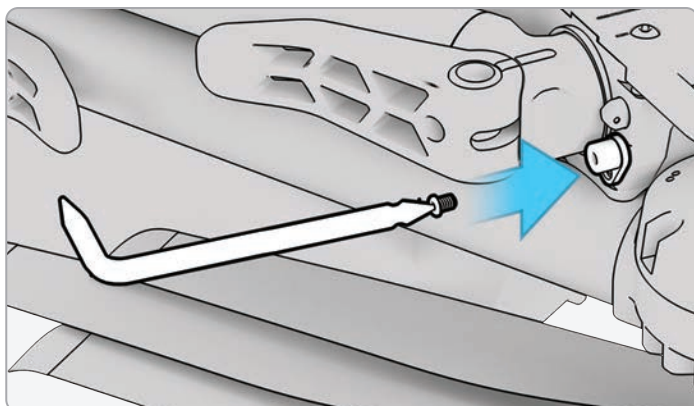**Step 3** – Install the new hard stop(s)

- Place the new hard stop in the socket – the larger diameter pin should be inserted into the drone, and the smaller diameter pin should face outward

- Line up the hole in the hard stop flange with the hole in the drone and insert the screw
- Tighten until the hard stop is secure

Maintenance

Format memory cards

Skydio X2D has two SD memory cards, one for storing media and another for recording flight logs. Each card will need to be formatted separately as-needed. Before formatting your SD card, please ensure any data has been copied or saved on another device.

Step 1 - Select the **INFO** menu

Step 2 - Select the vehicle name under **Devices**
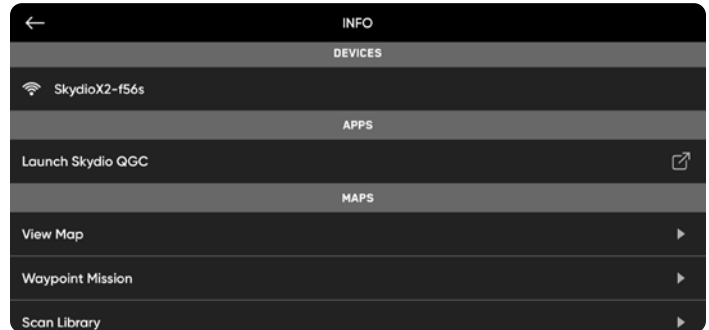
Step 3 - Select Manage Data

Step 4 - Select Format Media Card or Format Logs Card, depending on which card needs to be cleared
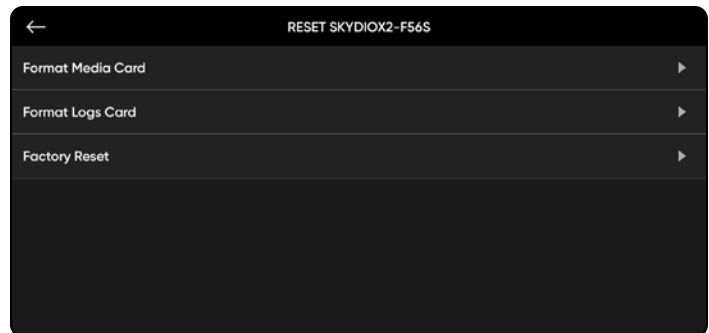
Memory Card Overwrite
Manage your media storage space by automatically deleting old media ensuring that you always have enough storage space to conduct a full flight. Toggle this setting on to automatically delete the oldest media stored on the SD memory card. This setting will persist across flights and power cycles.

Maintenance

Format memory cards

Step 5 - Select Delete

- A confirmation will display that all data has been cleared

Step 6 - Select OK

- You will return to the **INFO** menu
- Your SD card is now formatted
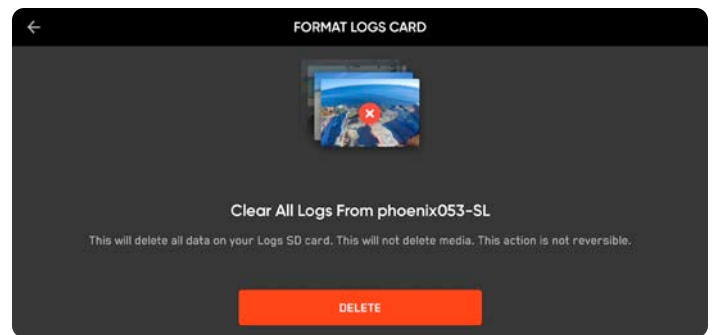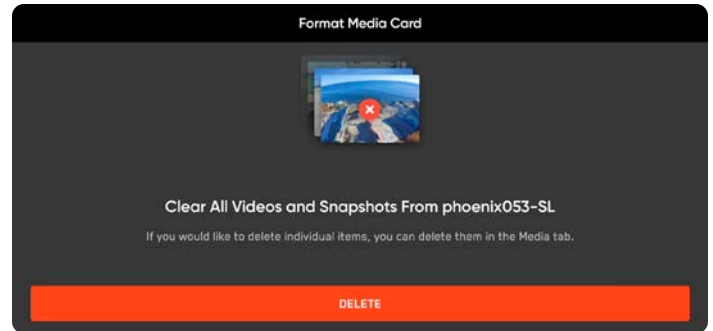
Flight History File

Step 1 - Select the **INFO** menu

Step 2 - Select the vehicle name under **Devices**

Step 3 - Select either:

- Do Not Store Flight History OR
- Store Flight History
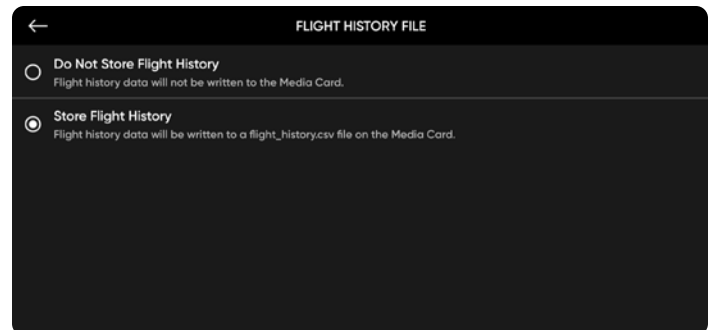
Flight history .CSV
Save flight information to a flight_log.csv file in the root folder of the media SD card containing flight data including:

- Vehicle name
- Flight ID
- Launch latitude/longitude and time
- Land latitude/longitude and time

Maintenance

Export flight logs

To export to a flash drive:

Step 1 - Ensure your controller battery is fully charged

- you cannot export and charge your controller simultaneously

Step 2 - Select the **INFO** menu

Step 3 - Select **Skydio Support Logs**

Step 4 - Insert a memory drive into the controller

Step 5 - Select Export to drive

Step 6 - Navigate to the folder you want to export your flight logs to and select Allow.

You will be prompted to select between exporting a Single Flight or All Controller Logs:

- **Single Flight Log** - Includes all logs from a specified flight. This option will show you the history of all flights, organized by date and time. Select which individual flight you wish to upload. This download may take a few minutes.

- **All Flight Logs** - Exports all logs saved on the controller from all flight history. This option allows you to sync logs whether you are connected to the vehicle or not.
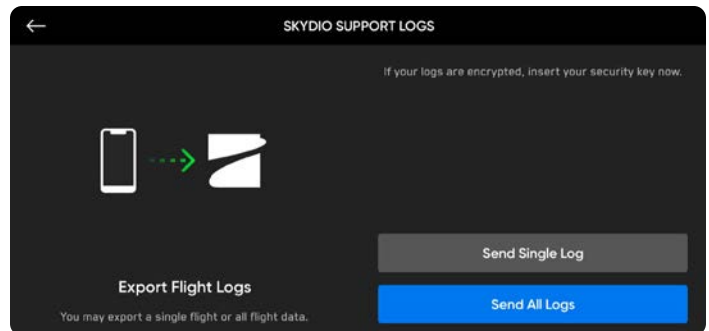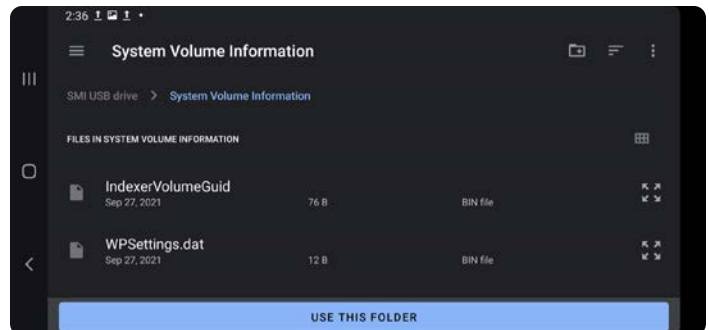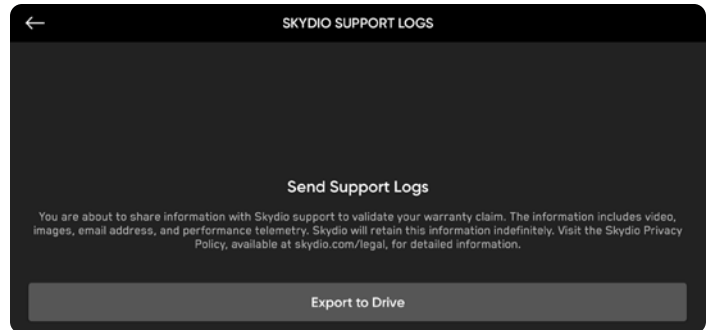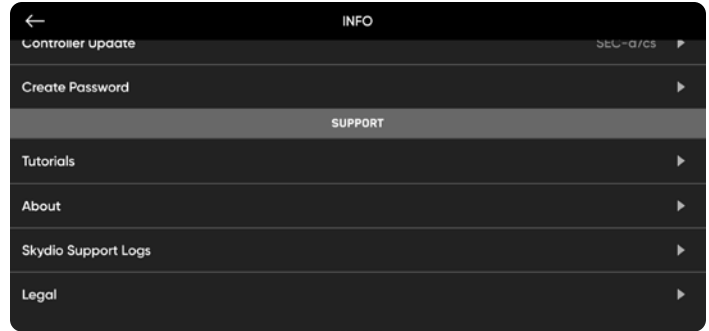
Troubleshooting

Resetting Skydio X2D

If Skydio X2D is unresponsive or off-nominal state, power-cycle the drone either using the power button or removing the battery.
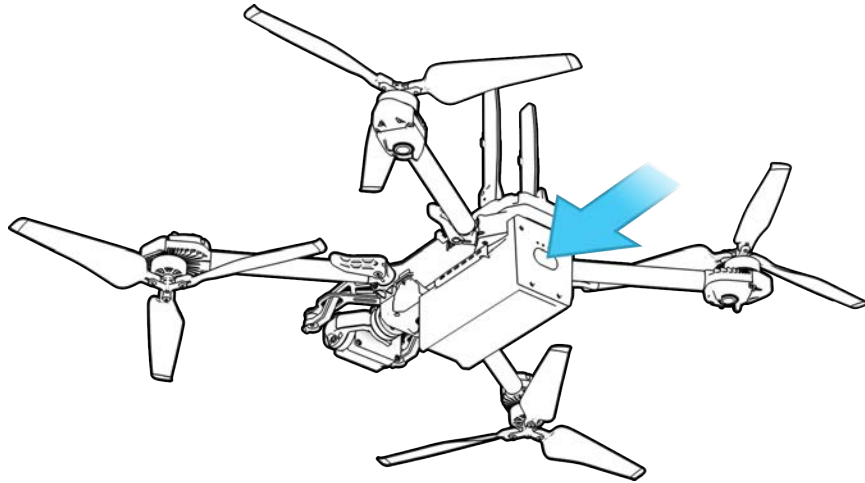
Resetting Skydio Enterprise Controller

If your Skydio Enterprise Controller is in an unresponsive or other off-nominal state, you may need to perform a hard reset. This will power off the controller and allow you to reboot, hopefully resolving any issues.
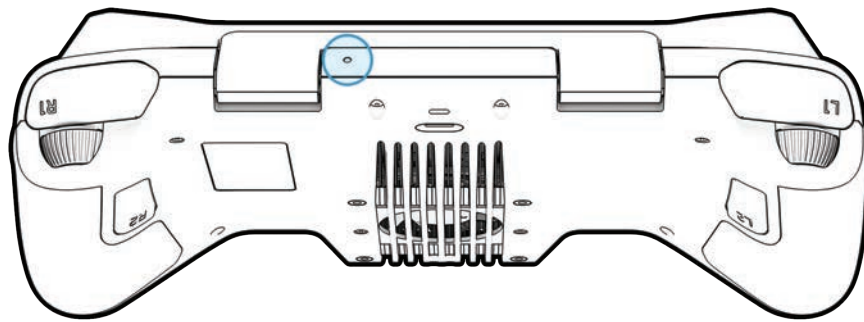
To reset your Controller:

- Press the hard reset button using the tip of a paper clip
- Select either Power Off or Restart

Your Controller will restart or power off, allowing you to power it back on again.

Troubleshooting

Weak signal

For best signal quality, always maintain a direct line of sight between the controller and Skydio X2D.

When flying at close range high altitude, point the controller cover toward the drone for maximum wireless performance.

When flying at max range, point the controller cover toward the drone while also keeping the controller as far away from your body as possible. Bringing the controller too close to your body will impact wireless performance.

Signal strength and maximum control range may be affected when flying in areas with electromagnetic interference.
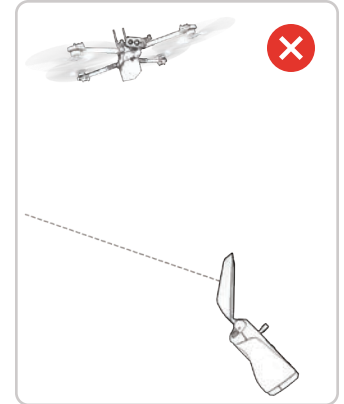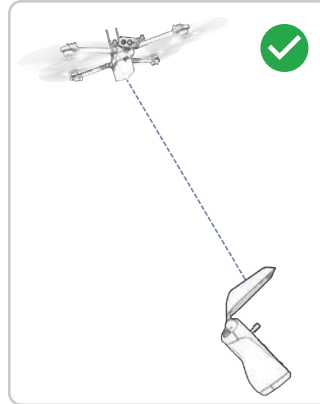
Specifications

AIRCRAFT	
DIMENSIONS (UNFOLDED, FLYING)	26.1" X 22.4" X 8.3" 66.3 cm X 56.9 cm X 21.1 cm
DIMENSIONS (FOLDED, NO BATTERY)	11.9" X 5.5" X 3.6" 30.2 cm X 14 cm X 9.1 cm
WEIGHT (WITH BATTERY)	1325 g
FLIGHT TIME	Up to 35 minutes
MAX FLIGHT SPEED (SEA LEVEL, NO WIND)	25 mph (40 km/h) fully autonomous
MAX WIND SPEED RESISTANCE	23 mph (37 km/h)
MAX SERVICE CEILING (ABOVE SEA LEVEL)	11,200 ft (3,414 m) MSL, 113°F (45°C) 12,000 ft (3,658 m) density altitude
OPERATIONAL TEMPERATURE RANGE	14°F (-10°C) to 109°F (43°C)
GPS SATELLITE CONSTELLATIONS	GPS and GLONASS

HANDSET	
DIMENSIONS	10.75" x 5.25 x 3.0" 27.3 cm X 13.3 cm X 7.6 cm
WEIGHT	1130 g
INPUT	Dual 2-axis joysticks, dual rockers & 10 buttons
SENSORS	GPS, Barometer, Compass, Gyro, ACC
MEMORY	256 GB disk
PROCESSOR	Qualcomm Snapdragon 855

PAYLOAD	
DIMENSIONS NOT TO EXCEED	1.75" x 1.0 x 2.0" 4.5 cm X 2.5 cm X 5 cm
WEIGHT NOT TO EXCEED	200 g
POWER NOT TO EXCEED	15 Watts

Specifications

CONTROLLER SOFTWARE	
APPLICATIONS	Skydio Enterprise
WIRELESS LINKS	--
WIRED LINKS	USB 3.1, (via dongle) HDMI
OPERATING FREQUENCIES	1.8 GHz / 5 GHz / Multiband
MAX RANGE	up to 10 km (1.8 GHz) up to 6 km (5 GHz) up to 10 km (Multiband)
CHANNEL BANDWIDTH	4 / 8 MHz (1.8 GHz) 5 / 20 MHz (5 GHz) 4 MHz (Multiband)
VIDEO	720p30
ENCRYPTION	AES-256

SKYDIO AUTONOMY	
MAIN PROCESSOR	NVIDIA Tegra X2 SOC
GPU	256-core NVIDIA Pascal™ GPU
CPU	Dual-Core NVIDIA Denver 2 64-bit CPU Quad-Core ARM®-A57 MPCore
RAM	4GB 128-bit LPDDR4
OBSTACLE AVOIDANCE COVERAGE	Omnidirectional and above/below super fisheye lenses for 360° view
3D WORLD MODEL UPDATE RATE	> 1 million points per second
WORLD MODEL-TO-ACTION UPDATE RATE	500 iterations per second
ONBOARD AI	9 custom deep networks used in flight
USER-SELECTABLE SUBJECTS FOR TRACKING	People and motor vehicles
OBJECT TRACKING AND IDENTIFICATION	Up to 20 simultaneous objects of interest
CALIBRATION	Automated calibration of lens parameters, camera rotations, wind speed, and air density

Specifications

PRIMARY CAMERA SYSTEM	
SENSOR TYPE	Sony IMX577 1/2.3" 12.3MP CMOS
SENSOR ACTIVE PIXELS	4056 (H) x 3040 (V)
LENS APERTURE	f/2.2
LENS FOCAL LENGTH	41mm (35mm format equivalent)
LENS DEPTH OF FIELD	1m – ∞
SHUTTER SPEED	electronic shutter 1 to 1/1920s
ISO RANGE	video 100–6400 photo 100–6400
EXPOSURE CONTROL	–2.0, –1.5, –1.0, –0.5, 0, 0.5, 1.0, 1.5, 2.0
IMAGE SIGNAL PROCESSOR	Qualcomm QCS605
GPU	Adreno™ 615
CPU	64-bit octa-core Kryo™ 300
DSP	Hexagon™ 685, 2x HVX
RESOLUTION AND MODES	3840x2160 30 fps 3840x2160 60 fps 1920x1080 30 fps
BITRATE	100 Mbps
VIDEO FORMAT	MPEG-4 (AVC/H.264, HEVC/H.265)
STILL RESOLUTION	4056x3040 (12 MP)
STILL FORMATS	JPEG, DNG (RAW)
STILL MODES	Single, Interval
DYNAMIC RANGE	13 stops
STORAGE	Removable Micro SD Card UHS Speed Class 3 / V30
STABILIZATION MECHANICAL RANGE	pitch ±124°, roll ±120
PITCH RANGE	–110° to +90°

Specifications

THERMAL CAMERA SYSTEM	
SENSOR TYPE	Uncooled VOx microbolometer
RESOLUTION	320X2D56
LENS APERTURE	1.02
LENS FOCAL LENGTH	9.1mm
LENS DEPTH OF FIELD	2m – ∞
FRAMERATE	30fps

NAVIGATION CAMERA SYSTEM	
CONFIGURATION	6x cameras in trinocular configuration top and bottom
SENSOR TYPE	Sony 1/3" 4K color CMOS
LENS APERTURE	f/1.8
FIELD-OF-VIEW	200°
ENVIRONMENT COVERAGE	True 360°
FRAME RATE	30 FPS

SYSTEM SECURITY	
WIRELESS ENCRYPTION	AES-256
FIRMWARE	Signed and encrypted
MEDIA ENCRYPTION	4 / 8 MHz (1.8 GHz) 5 / 20 MHz (5 GHz) 4 MHz (Multiband)
CONTROLS	Ability to provision and deprovision devices
INFRASTRUCTURE	Key provisioning burned-in at time of manufacture

Legal

Warranty

Skydio warrants the included hardware product will be free from defects in materials and workmanship under normal use in accordance with Skydio published user documentation for one year from the date of original retail purchase in its original packaging by you (the "Limited Warranty"). Skydio published user documentation includes the Safety Guide and the User Guide.

Skydio does not warrant against normal wear and tear, nor damage caused by accident or abuse. The Limited Warranty is not applicable to any software provided with the hardware product or any propellers. Subject to the full terms and detailed information on obtaining service available at www.skydio.com/legal/warranty/products/X2D, if you submit a valid claim under this warranty, Skydio will either repair, replace, or refund your Skydio X2D at its own discretion. Warranty benefits are in addition to rights provided under local consumer laws. You may be required to furnish proof of purchase details when making a claim under this warranty.

California Prop 65 Warning

For the Skydio X2D Battery: Lithium-ion Batteries and / or products that contain Lithium-ion batteries can expose you to chemicals including cobalt lithium nickel oxide and nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

For the Skydio Enterprise Controller: This product can expose you to chemicals including cadmium, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

Legal

Compliance statement

These devices comply with Part 15 of the FCC Rules and with ISED Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) these devices may not cause harmful interference, and (2) these devices must accept any interference received, including interference that may cause undesired operation.

Ces appareils sont conformes aux normes RSS exemptes de licence d'ISDE Canada. Leur fonctionnement est soumis aux deux conditions suivantes: (1) ces appareils ne doivent pas causer d'interférences nuisibles, et (2) ces appareils doivent accepter toutes interférences reçues, y compris les interférences susceptibles d'entraîner un fonctionnement indésirable.

Changes or modifications not expressly approved by Skydio could void the user's authority to operate these devices.

These devices have been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when these devices are operated in a commercial environment. These devices generate, use and can radiate radio frequency energy and, if not installed and used in accordance with the user guides, may cause harmful interference to radio communications. Operation of these devices in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de classe A est conforme a la norme Canadienne NMB-003.

Software license

The Skydio software end-user license agreement (available at www.skydio.com/legal/eula) governs the use of any Skydio software that is pre-installed, downloaded, installed or otherwise provided in connection with any included hardware.

Additional Resources

For all the latest information about Skydio and our products, visit www.skydio.com.

For legal information, visit www.skydio.com/legal.

Skydio products are protected by patents and trademarks, registered in the U.S. and other countries. More information can be found at www.skydio.com/legal/ip.

Skydio