

Overview



SKYDIO X10D INSTRUCTOR MATERIALS

This document contains the following instructor materials:

- Flight Cards 1-5
- Check Ride
- Grading Rubric
- Master Task List
- Course Schedule
- Course Syllabus
- X10D Ground Exams (W/ & WO/ answers)
- Scenario Based Training

Flight Card 1 | Manual Flight

Flight Card 1 | Manual Flight

Duration	.5 hrs
Mission Environment	Sim + Live
Requirements	• Functional X10D System + Controller • Approved Airspace
Terminal Learning Objectives	• Safely pre-flight, launch, fly, and land the X10D in a simulated operational environment
Enabling Learning Objectives	• Conduct Preflight of environment and aircraft • Safely launch • Examine emergency procedures • Examine On-screen user interface • Conduct manual flight • Begin operating sensor package during flight • Manually navigate aircraft to launch location • Safely Land and conduct post-flight examination
Preflight Brief	

- Check weather
 - Ensure weather is suitable for the flight
- Check terrain
 - Understand the terrain
- Mission
 - Ensure your student understands the mission/objective for the flight
- Roles
 - Identify roles and ensure everyone understands (VO, student, RPIC, etc...)
- Emergency procedures
 - Identify where the nearest hospital is and who is responsible for dialing 911
 - Identify any personnel who may have first aid experience
 - Identify who will be responsible for recovering the aircraft in the event of a crash
 - Identify any other safety procedures (fire extinguishers, emergency exits, etc...)

Power on and Log in to your Skydio X10D Controller (with wifi enabled controller)

- Press and hold the power for 5 seconds
- Enter the credentials for your WiFi network
- Select your language
- Enter your email address that is associated with your Skydio Cloud organization
- Receive the 6-digit login code to that email
- Enter that code into the controller app
- Set a PIN

Power on and Log in to your Skydio X10D Controller (without wifi enabled controller)

- Press and hold the power for 5 seconds
- Select your language
- Set a password for your controller

Power on the X10D

- Remove the X10D from its case
- Unfold the arms and props
 - Front arms first, then rear arms
- Remove the sensor package lock
 - Use one hand to hold the gimbal steady and lift the sensor package lock with the other hand
- Remove the battery from the case
- Inspect the battery for damage and obstructions on the magnet or pin slots
- Safely insert the battery into the aircraft and ensure it is fully seated
- Power on the X10D
 - Hold the battery button for 3 seconds or until the battery LEDs dim
- Pair the controller and aircraft
 - Connect the included USB-C cable to the rear port on the aircraft and the controller
 - Remove the cable from the aircraft when prompted to do so
- Recommend keeping the X10D in the shade until you are ready to launch
- Navigate to Global Settings > Information > Select your drone > Radio
 - Set radio power to max
 - Configure your DCS presets
 - Select Finish (this saves your presets)
 - Ensure you are deconflicting with other aircraft/equipment to avoid using the same channels/frequencies

Prepare for Flight

- **Flight controls**
 - Sensitivity
 - Recommend leaving these at default and using boost instead to fly faster when

necessary

- Controls

- Ensure the student is using mode 2
- Adjust input mapping to pilot preference
- Map “Fly in Attitude Mode” to L2
 - This places the X10D in attitude mode while the operator is holding L2

- Limits

- Adjust height limits appropriate to the operating area
- Adjust weak GPS toggle
 - Recommend leaving this off as high altitude VIO allows a climb to ~984 feet without GPS

- Launching

- Toggle on Low Launch in confined spaces or as appropriate

- Landing

- Recommend leaving Auto land in Attitude on

- **Return**

- Applies to auto returns and pilot commanded returns

- Backtrack

- X10D retraces its outbound path to return

- Height behavior

- Absolute VS Relative
 - Recommend using Absolute
- Return Height
 - Ensure appropriate for mission and area
- Drone Will Face
 - Recommend away from return
 - Keeps sensor on subject/area longer
 - Maintains covert/protective posture by not recording the pilot location as it returns

- Additionally, provides intuitive flight controls if the pilot takes over in an emergency
- Speed
- Low Battery
 - Recommend always Ask
- Lost Connection
 - Applies to Link loss/Lost Connection only
 - Return vs Hover
 - Recommend Return to improve aircraft recoverability
 - Wait before return
 - Recommend ~30 seconds or longer to allow time to troubleshoot, move other aircraft out of the way, prepare for landing. Also prevents returns for short/intermittent link loss.
 - Land After Return
 - Recommend leaving this on and adding 60 seconds or greater to allow time to troubleshoot
- **Radio**
 - Flight Connection
 - Displays signal strength and bitrate
 - Enable DCS (Dynamic Channel Switching) to have the X10D switch through your presets when the signal quality degrades
 - You can also manually switch between your DCS presets whenever you desire (you just have to set at least 2 presets in order to switch)
- Adjust any additional settings if necessary
 - **Sensing**
 - Flight Environment
 - Low Light at night only or if needing to turn VIO off
 - Also turns OA off
 - Obstacle avoidance
 - Adjusts OA margins

- Variable margins will auto-contract or expand margins
- Stop at structure is useful for up-close inspections
- GPS Navigation should be toggled on unless you are aware of any jamming or spoofing happening
 - This must be toggled off in order to use the Anchor Point function
- **Lighting**
 - Blackout mode turns off all lights on the aircraft including IR lights like the time of flight sensor and dims the controller LEDs.
 - RGB
 - Police lights (red and blue)
 - Emergency lights (red and white)
 - Navigation lights (red and green)
 - Strobe meets the FAA's requirement for anticollision lighting (visible from 3 statute miles or greater)
 - Infrared is a solid light and cannot be turned on together with strobe lights
 - DIM controller LEDs is useful during night ops
- **Sharing**
 - **ATAK**
 - Start the ATAK app
 - Network Connections
 - Enter the Server Name (get this from the student's ATAK admin)
 - Enter the server IP address (get this from the student's ATAK admin)
 - Enter the server port number (get this from the student's ATAK admin)
 - Advanced options (security protocol)
 - TCP | No password or security certificates required
 - SSL | Security certificates required (get this from the student's ATAK admin)
 - Return to the ATAK menu and select Telemetry
 - Assign and vehicle callsign and operator callsign
 - Toggle on Publish Telemetry

- RTSP (Real Time Streaming Protocol)
 - Must be connected to wifi
 - Select Internal to use the X10D as the RTSP host server
 - IP address and Port number are displayed
 - Provide to anyone who wants to view
 - Name the stream
 - Select External to connect to an external server
 - Must input the IP address and Port number of the server you wish to connect to (get this from the student's ATAK admin)
 - Name the stream
 - Toggle on RTSP
- **Display**
 - Telemetry
 - Recommend the following telemetry items to display
 - Altitude (mandatory)
 - Heading
 - Ground Speed
 - Gimbal Pitch
 - Distance From Controller
 - Radio Frequency
 - Gridlines
 - Displays gridlines on video feed to help with image composition
 - Can also choose which camera the gridlines appear on
 - Brightness
 - Controller screen brightness
 - Turn down at night
 - Units
 - Choose the unit of measure
 - Depth style
 - Outline | Displays just the outline of the AR boxes

- Solid | Displays shaded in boxes when the AR overlays are toggled on
- Crosshair coordinates
 - Toggle on or off
 - Must have DTED loaded in order to receive grid coords
- Screen recording starts on launch and ends upon landing
- **Sound**
 - Low battery, photo shutter, and air traffic alert volume
- **System Status**
 - Displays signal status of all emitted or received signals
- **Attachments**
 - Appears only when attachments are connected

Enable Encryption (as required)

- Navigate to Global Settings > Information > Select your device > Encryption > Enable/Disable as required

Perform a Preflight Inspection

- Inspect the X10D for cleanliness and serviceability
 - Chassis, arms, legs, sensor package frame, sensor package, rubber isolators | Ensure there are no cracks, missing screws, or any other damage
 - Inspect the props
 - Ensure there are no nicks, cracks, or any other damage
 - Close/seal all rubber gaskets/covers
 - Clean the navigation cameras

Launch the Skydio X10D (ground)

- Place the X10D down in an open area
 - Ensure there are no obstructions around the props
 - Ensure the X10D has enough vertical space to launch
 - 6' 7" for a normal launch
 - 3' for Low Launch
- Press and hold the Launch/Land button on the controller OR slide the on-screen slider from left to right
- Observe the aircraft climb to 10 feet (if clearance allows) and rotate 360 degrees
 - This spin is a basic calibration of the IMU and magnetometer
- Determine lighting config (on/off? Pattern?)

Manual Flight

Trainer will identify a notional target and have the student fly to it in manual, and perform reconnaissance.

- Use the joysticks to navigate to the target area
 - Right joystick controls lateral movement (roll left/right, fly forward/backward)
 - Left joystick climbs/descends and yaws left/right
 - Climb en route to 200ft (or the approved altitude)
- Once on target
 - Switch to video recording mode
 - Start recording
 - Pitch camera with the left scroll wheel or swipe on screen
 - Tap to focus
 - Zoom in with the right scroll wheel or pinch to zoom
 - Explain that zooming in is good for obtaining detail but you don't want to stay zoomed in too much otherwise you will miss what's happening around the tgt (this is called the soda straw effect)
 - Stay at zoom level that allows you to see the target AND the surrounding area at the same time
 - There will still be times when you have to zoom in to obtain the necessary data/intel
 - VT300-Z max zoom is 128x and switches between the narrow and telephoto lens at 4.3x
 - VT300-L max zoom is 64x
 - The X10D's yaw and gimbal speed will slow as you zoom in to improve image stability
 - Position the X10D in a different location to get a different viewing angle
- Switch to thermal sensor
 - Tapping the thermal PIP (if present); OR
 - Selecting the thermal sensor from the view drop down; OR
 - Pressing the button that was mapped by the pilot
- Change the thermal palette and explain the pros/cons of each
 - White Hot is great for recon purposes as it allows you to quickly identify hot/cold spots. Works best during the day.
 - Black Hot is also great for recon and is best during night ops

- Ironbow and Rainbow are great for inspection uses as it can pick up and more clearly display subtle temperature differences
- When satisfied, have the student navigate to another notional target
- Ensure the student uses the boost function to get there ASAP
 - Boost with OA on = 36mph
 - Boost with OA off = 45mph
 - If sensitivity settings are set to max, you might not notice a speed difference when using boost
- Investigate using the color sensor
 - Switch to photo mode
 - Manually focus the camera using the onscreen controls
 - Mountain = Focus far
 - Flower = Focus near
 - Have the student look into a shaded/dark area
 - Adjust the Brightness (EV)
 - Take a picture using the right shoulder button
 - Assume a manual orbit around the tgt
 - Take a photo facing each cardinal direction (north, south, east, west)
 - Enable either crosshair or centerpoint gridline to help keep object centered
- Choose 3rd notional target and use the Fly Here now function
 - Long press on that location of the map and select Fly Here Now
 - As the X10D is transiting, switch back to video mode and start recording
 - Once on tgt, use the terrain to mask the aircraft location
 - Keep the aircraft at a distance
 - Descend below the treeline, or hill, or buildings to mask the aircraft's location
 - Ensure your lights are off as this will give away the X10D's position
 - Adjust the camera focus manually and use the lock icon to lock the focus
 - Use the sun to mask your location
 - This typically works best when the sun is close to the horizon
 - Place the aircraft between the sun and the target
 - The brightness of the sun will mask the location (no one stares at the sun)

- Use the wind to mask your sound
 - Position the aircraft downwind from the tgt
 - The wind will carry your noise signature away from the tgt area
- Press the AF button to set the focus back to auto
- Locate the pilot's location on the map
 - Make the map full screen and hide the PIP
 - Navigate to the pilot location using only the map (do not allow the pilot to look up at the drone)
 - Emphasize that the drone does not need to be facing the pilot (it's a quad... It can fly backwards and sideways)

Set a Home Point

- Discuss the importance of setting a Home Point
 - Can serve as an alternate landing location
 - Important when conducting mobile ops
 - Update the HP as you move positions so that the aircraft returns to the desired location and not your previous site
- Long press on the desired HP location
- Select "Set Home Point" when it appears
- Remind your student that the aircraft will return here instead of the launch location upon link loss/lost connection
- Long press on another area of the map to move the HP
 - Select "Set Home Point" when it appears
- Tap on the HP and select "Fly Here Now"
- When you arrive, tap on the HP and press "Remove Home Point" when it appears

Obstacle Avoidance

This exercise is designed to build your student's confidence in the Obstacle avoidance system.

- Verify that your OA margin is in Standard
 - Fly towards an obstacle and observe the X10D navigate around it
 - Your X10D will remain 24 inches away from obstacles if “Variable Margins” is toggled off
- Change your OA margin to “Close” by selecting the Quick Action button on the left of the screen or by going into the Global Settings menu and selecting Sensing
 - Descend until the aircraft stops on its own
 - Your X10D will remain about 6 inches away from obstacles
 - Observe the yellow caution banner around the screen and the “Close Obstacle Avoidance” message at the bottom of the screen
- Change your OA margin to “Minimal”
 - **DO NOT DESCEND**
 - The aircraft will only slightly assist in avoiding obstacles
 - Responsibility to avoid obstacles lies with the pilot
 - Observe the yellow caution banner around the screen and the “Minimal Obstacle Avoidance” message at the bottom of the screen
- Turn your OA off by navigating to the Sensing menu and toggling it off
 - **DO NOT TEST** this one either
 - Observe the yellow caution banner around the screen and the “Obstacle Avoidance Disabled” message at the bottom of the screen
- Toggle Standard OA back on
- Toggle “Stop at Structure” on and turn the “Speed Near Obstacles” down to 1 mph
 - Fly towards an obstacle and observe how the aircraft stops instead of navigating around it
 - This is very useful for inspection uses as it allows you to get extremely close to a structure while keeping the aircraft and camera steady

Attitude Mode

USE CAUTION WHEN FLYING IN ATTITUDE MODE

- Attitude mode disables the aircraft's GPS and VIO navigation methods
- This means that the aircraft will not be able to navigate without assistance from the pilot
- The aircraft also becomes susceptible to drift, meaning wind can blow the aircraft off course
- Place the X10D in Atti mode by enabling the Attitude Mode in the Sensing menu
- Navigate to a target in atti mode
- Record a video while manually orbiting the tgt for 360 degrees

Return & Land***Still in Attitude Mode.***

- Manually navigate back to the landing location
- Clear the landing area and prepare to land
- Point the camera down and center the drone on the landing surface
- Descend to 10 ft above the landing surface
- Press and hold the land button until the aircraft starts descending to land
- Allow the motors to shutoff before approaching
- Allow the Task Que to complete before powering down
 - This may only last a few seconds
 - Wait for the Ready to Fly message to appear
- Allow the aircraft battery, attachment, or sensor package to cool down as necessary
- Power down the drone and controller
- Remove the battery
 - Pilots may remove the battery without powering down. This will not cause any damage.

End of Flight Card

Flight Card 2 | Autonomous Flight

Flight Card 2 | Autonomous Flight

Duration	.5 hrs
Mission Environment	Sim + Live
Requirements	• Functional X10D system and controller • Approved Airspace
Terminal Learning Objective	• In addition to safely pre-flighting, launching, flying, and landing the X10D in a simulated operational environment; students should also be able to utilize the Orbit Point, and Waypoints skills during their flight(s)
Enabling Learning Objectives	• Assemble the Skydio X10D • Conduct a preflight inspection of the Skydio X10D • Perform a hand launch and landing • Begin use of automated flights with Orbit Point, Waypoints
Preflight Brief	

- Check weather
 - Ensure weather is suitable for the flight
- Check terrain
 - Understand the terrain
- Mission
 - Ensure your student understands the mission/objective for the flight
- Roles
 - Identify roles and ensure everyone understands (VO, student, RPIC, etc...)
- Emergency procedures
 - Identify where the nearest hospital is and who is responsible for dialing 911
 - Identify any personnel who may have first aid experience
 - Identify who will be responsible for recovering the aircraft in the event of a crash
 - Identify any other safety procedures (fire extinguishers, emergency exits, etc...)

Build a Waypoint Mission

Trainer should help the student build a realistic mission and not just send 5 random waypoints

- Navigate to Global Settings > Information > Waypoint Mission
- If the map does not default to your location, press the crosshair icon on the top left corner of the screen
 - This will center the map on the controller location
- Open the Map Settings menu by tapping on the map icon in the top left corner (next to crosshair icon)
- Search bar
 - Can search addresses or landmarks if connected to WiFi
- Ignore Anchor Point
 - Drone must be powered on and GPS must be turned off in order to set an Anchor Point
- Show Coordinates - Displays coordinates for Home, Launch, Controller, and Aircraft locations
- Show Crosshairs - Displays the crosshairs and coordinates for the crosshairs on the map

- Coordinate System allows you to choose between Lat/Long, MGRS, and UTM
 - Select MGRS
- Start building your mission
 - If there is not a mission saved, a prompt will appear in the top right corner of the screen telling you to “Press and hold on the map to set a waypoint.”
- Set your first waypoint by pressing and holding on the desired location and selecting “Add Waypoint” when it appears
 - Try not to move the map too much as the “Add Waypoint” menu will not appear if this happens
 - You will see a menu appear
 - This menu allows you to configure heading, gimbal angle, and altitude
 - Recommend setting the altitude now as every new waypoint will inherit the previous waypoint's settings
 - If setting a gimbal angle and heading is required, configure this for each individual waypoint as these settings are likely to change based on the waypoint location
 - Add 5 more waypoints
- Select a random waypoint by tapping it
 - You can edit this waypoint's settings by adjusting the sliders
 - You can also drag the waypoint to change its location
- To delete a waypoint, tap and hold it until “Delete Waypoint” appears
 - You can also delete it by tapping it once and selecting “Delete Waypoint” in the waypoint settings
- Explain the colors of the waypoints
 - Green represents the first waypoint in the mission
 - Red represents the final waypoint in the mission
 - White represents all waypoints in between
- This is about as far as we can go right now. There are more settings that we can configure after we launch

- Power on the X10D and controller
- Perform a preflight inspection of the system
- Configure big 3 settings (Flight Controls, Return, Radio)
 - Don't forget to set radio power to max
- Clear the area for launch

Hand Launch the X10D

Trainers... Demonstrate the hand launch to your student first

- When ready, select Fly Now
- Hold the X10D by the battery with the camera facing away
- Ensure the wind is blowing at your back
 - This is to prevent a gust of wind from pushing the aircraft towards you
- **Trainers... Brief the students on the following**
 - **The drone will perform 2 quick full throttle bursts... Hold the drone steady during this process as the bursts will disturb the balance of the drone in your hand**
 - **After the full throttle bursts, the drone will begin the launch sequence...**
 - **Slowly release the drone as the drone starts to lift off**
 - **Do NOT push or toss the drone into the air**
 - **Do NOT let go too early**
- Hold the drone up at shoulder height or higher and ensure it is level
- To launch
 - Press and hold the launch/land button on the controller; OR
 - Slide the on-screen slider; OR
 - Tap the battery button 4 times
- Slowly release as the X10D starts to lift off

Build a Waypoint Mission (continue)

- Select the Skills menu from the top right corner of the screen
- Select Waypoints
- An additional menu will appear that allows you to set
 - Mission speed - How quickly the aircraft transits in between waypoints

- Return Behavior
 - Return - Commands the aircraft to execute the return behavior upon link loss
 - Continue Mission - Allows the aircraft to finish the waypoint mission before returning
- Photo at Waypoint - if toggled on, the aircraft will take a photo at each waypoint
- When ready, deselect the mission by tapping on the map
- The mission automatically saves

Execute a Waypoint Mission

- Press the “Start” button when it appears - This commands the aircraft to start the waypoint mission
- Observe the aircraft fly through the first (green) waypoint
 - You’ll notice a “Reverse” button appear on the screen
- As the X10D is approaching the third waypoint, press the reverse button
 - This commands the X10D to fly the same waypoint mission but in reverse order
 - This is useful in route reconnaissance situations or to fly back to an area of interest along the mission
- Press the reverse button again to command the X10D to fly the mission in the intended direction/order
- While back enroute to waypoint three, yaw the aircraft and adjust the gimbal to enter free look mode
 - Observe that aircraft continues mission in free look
- Pause the mission enroute to waypoint four
 - When paused, you have the option to
 - Resume - pick up where you left off; OR
 - Abort - which erases progress and forces you to fly the mission from the start
- Resume the mission
- Enroute to waypoint 5, observe the distance to the next waypoint in the top right corner of the screen
- Once the mission is complete, the X10D will hover at the final waypoint
 - There is no loop function

Orbit

- Select the Skills menu from the top right corner of the screen
- Select “Orbit Point”
 - Orbit point may be an effective tool to collect and provide full situational awareness of subjects or

a target

- Orbit point may also be used to measure distance to a target if its approximate location on the map is known
- **Trainers: Identify and describe a real target for the student to then find on the map**
- Long press the location of the target on the map
 - Select “Set Focus Point”
 - Observe the radius of the orbit begins at the distance of the X10D from the focus point
- Pitch the X10D forward or backward with the right stick to decrease or increase the radius of the orbit
 - Observe the increase or decrease of the orbit’s radius in the top right corner
 - Adjust the camera angle while changing the radius to observe the target
 - Recommend a radius that is appropriate for the target
 - Large to decrease the audible signature of the X10D and increase stealth
 - Small to collect better visual information
- Begin orbit by banking the X10D right or left with the right stick
 - Observe that the aircraft autonomously makes adjustments to track along the orbit with only banking stick deflections
 - Observe the sensor stays aligned radially with the center of the orbit
 - If the camera is not aligned with the intended target all the time, then the chosen focus point is a little off on the map
 - Observe the AR pillar that appears above the focus point
 - Note that the orbit stops when the right stick deflection stops
- Begin orbit by dragging the slider in the bottom right to the left or right
 - Note that the orbit does not stop by simply releasing the slider
 - Note change in speed or direction of the X10D corresponds to change in slider position
 - Observe aircraft behavior when inputting left stick deflections
 - Yaw is ineffective
 - Note the decrease in SA around the X10D due to fixed sensor direction
 - Up/down increases or decreases altitude
 - Press play/pause to pause or resume the orbit
 - Pause the orbit

- Adjust the radius using your finger to move the handle on the orbit ring
 - Observe that the X10D does not move until you resume the orbit
- Tap and drag the focus point on the map
 - Notice that the radius will remain the same
 - Resume orbit and observe aircraft movement to new orbit
 - Pause the orbit
- Describe a new target for the student to measure a distance from the X10D
- Identify the new target on the map and long press on the map to move the focus point
 - Note that the radius resets to the distance from the X10D to the new target
 - Collect the distance to the new target

Return & Hand Land

- Return to the landing location
- **Trainers... Brief the students on the following**
 - Fly the aircraft directly overhead
 - Ensure the X10D is facing away from you
 - Ensure the area on the ground around you is flat and free of trip hazards
 - This is to avoid tripping or hurting yourself as you reposition under the drone
 - If possible, turn off aircraft lighting to avoid blinding yourself
 - Command the X10D to land
 - Once the aircraft reaches 10ft above the landing surface, it will pause its descent, turn off OA, and resume the landing sequence
 - As the aircraft descends, grab it by the battery and hold it steady
 - Do NOT move the aircraft until the motors shut off
 - If you move the aircraft before the motors shut off, the drone may think it is still landing and will try to counteract the unexpected force

End of Flight Card

Flight Card 3 | Sensor Operations

Flight Card 3 | Sensor Operations

Duration	.5 hrs
Mission Environment	Live
Requirements	• Functional X10D system and controller • Approved Airspace
Terminal Learning Objective	• In addition to safely pre-flighting, launching, flying, and landing the X10D in a simulated operational environment; students should also be able to utilize the Track in Place skill, and capture content using the X10D sensor package
Enabling Learning Objectives	• Assemble the Skydio X10D • Conduct a preflight inspection of the Skydio X10D • Perform a hand launch and landing • Demonstrate effective understanding of Track and Follow • Demonstrate effective understanding of the sensor package, including thermal settings
Preflight Brief	

- Check weather
 - Ensure weather is suitable for the flight
- Check terrain
 - Understand the terrain
- Mission
 - Ensure your student understands the mission/objective for the flight
- Roles
 - Identify roles and ensure everyone understands (VO, student, RPIC, etc...)
- Emergency procedures
 - Identify where the nearest hospital is and who is responsible for dialing 911
 - Identify any personnel who may have first aid experience
 - Identify who will be responsible for recovering the aircraft in the event of a crash
 - Identify any other safety procedures (fire extinguishers, emergency exits, etc...)

Prepare the X10D for Launch

- Power on the X10D and controller
- Perform a preflight inspection of the system
- Configure big 3 settings (Flight Controls, Return, Radio)
 - Don't forget to set radio power to max
- Clear the area for launch

Hand Launch the X10D

Trainers... Demonstrate the hand launch to your student first

- When ready, select Fly Now
 - Hold the X10D by the battery with the camera facing away
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- Ensure the wind is blowing at your back
 - This is to prevent a gust of wind from pushing the aircraft towards you
 - **Trainers... Brief the students on the following**
 - **The drone will perform 2 quick full throttle bursts... Hold the drone steady during this process as the bursts will disturb the balance of the drone in your hand**
 - **After the full throttle bursts, the drone will begin the launch sequence...**
 - **Slowly release the drone as the drone starts to lift off**
 - **Do NOT push or toss the drone into the air**
 - **Do NOT let go too early**
 - Hold the drone up at shoulder height or higher and ensure it is level
 - To launch
 - Press and hold the launch/land button on the controller; OR
 - Slide the on-screen slider; OR
 - Tap the battery button 4 times
 - Slowly release as the X10D starts to lift off

Track & Follow

- Select the Skills menu from the top right corner of the screen
- Select “Subject Track”
 - Subject Track may be an effective tool to keep your sensor locked onto an individual or vehicle and provide the pilot with the ability to keep a target in frame while also moving the aircraft
- **Trainers: Identify and describe a real target for the student to then find**
- Once Subject Track has been selected, up to 20 targets will populate on the controllers screen
 - Tap the square surrounding your target to begin tracking
 - A green rectangular outline indicates a target is being tracked
 - While Track is active, your drones gimbal will be locked on the subject and the operator will not be able to control the yaw or gimbal pitch of the aircraft
- Observe the aircraft behavior when a target is actively being tracked
 - Deselect and then reacquire a target using Track
 - Fly the aircraft directly at an active target and observe drone behavior
- Describe a new, moving target for the student to acquire
 - Ensure the drone's altitude is >60' AGL and OA is ON.
 - Describe the behavior of the Follow feature
 - Have the student transition from track to Follow
 - Discuss/display predictive reacquisition
 - Anticipate obstructions, utilize zoom, and avoid tracking directly overhead

- Adjust the zoom level of the camera by pinching to zoom in/out, and using the zoom wheel on the controller
 - Use the widgets to adjust zoom
 - Use the auto focus and manual focus button - observe camera behavior
- Minimize and re activate the on screen PiP
 - Cycle through the available PiP feeds
- On the right side of the screen select the icon that states 'Camera settings' (ensure the camera is in 'Photo' mode)
 - Select each item within the capture menu and adjust it left or right - observe camera behavior
 - Select 'Reset' at the bottom of the Capture tab
 - Select the 'Settings' tab next to capture
 - Manipulate each item, starting with File Type - Observe camera behavior
 - Select 'Reset' at the bottom of the tab
- Change settings from 'Photo' to 'Video'
- On the right side of the screen select the icon that states 'Camera settings'
 - Select each item within the capture menu and adjust it left or right - observe camera behavior
 - Select 'Reset' at the bottom of the Capture tab
 - Select the 'Settings' tab next to capture
 - Manipulate each item, starting with Auto Start Recording - Observe camera behavior
 - Select 'Reset' at the bottom of the tab
- **Trainers: Identify and describe a real target for the student to then find**
 - Students should record at least 1 photo and 1 video

- On the right side of the screen select the icon that states 'thermal settings'
 - Select the spot meter to populate a spot on the center of the controller that will obtain temp readings from a specific item or region on the screen
 - A PiP will populate on the left side of your screen for more accurate measurements
 - A temp reading should display wherever the pilot drags their spot meter
- Return to thermal settings, enable Region of Interest
 - Move or drag ROI around the screen
 - Size RIO window to show min/ max and average temps in ROI
 - Observe high/ low "spots" within ROI
- Return to thermal settings
- Underneath Region, cycle through the various color palettes (WH, BH, RB, IB)
- Select Manual FFC - Observe results
- Return to thermal settings and select 'More'
 - Change thermal mode from Recon the Inspect, observe differences
 - Change temp range to Wide, observe changes, set preference
 - Use Emissivity slider to change sensitivity, observe changes
- **Trainers: Identify and describe a real target for the student to then find**
 - Students should record at least 1 thermal photo and 1 thermal video

Return & Hand Land

- Return to the landing location
- **Trainers... Brief the students on the following**
 - Fly the aircraft directly overhead
 - Ensure the X10D is facing away from you
 - Ensure the area on the ground around you is flat and free of trip hazards
 - This is to avoid tripping or hurting yourself as you reposition under the drone
 - If possible, turn off aircraft lighting to avoid blinding yourself
 - Command the X10D to land
 - Once the aircraft reaches 10ft above the landing surface, it will pause its descent, turn off OA, and resume the landing sequence
 - As the aircraft descends, grab it by the battery and hold it steady

- Do NOT move the aircraft until the motors shut off
- If you move the aircraft before the motors shut off, the drone may think it is still landing and will try to counteract the unexpected force

End of Flight Card

Flight Card 4 | Low Light/Night Operations

Flight Card 4 | Low Light/Night Operations

Duration	.5 hrs
Mission Environment	Live
Requirements	• Functional X10D System + Controller • Approved Airspace • Low-light or Dark environment
Terminal Learning Objectives	• Safely pre-flight, launch, fly, and land the X10D in a low light environment
Enabling Learning Objectives	• Conduct Preflight of environment and aircraft • Safely launch • Enable Settings to allow Low Light flight • Safely fly in low light environment • Respond to emergencies during low light flight • Operate sensor package during low light flight • Demonstrate understanding of GPS only flight • Manually navigate aircraft to launch location • Safely Land
Preflight Brief	
• Check weather ◦ Ensure weather is suitable for the flight • Check terrain ◦ Understand the terrain • Mission ◦ Ensure your student understands the mission/objective for the flight • Roles ◦ Identify roles and ensure everyone understands (VO, student, RPIC, etc...) • Emergency procedures ◦ Identify where the nearest hospital is and who is responsible for dialing 911 ◦ Identify any personnel who may have first aid experience ◦ Identify who will be responsible for recovering the aircraft in the event of a crash ◦ Identify any other safety procedures (fire extinguishers, emergency exits, etc...)	
Prepare for Flight	

- **Conduct all Preflight Inspections, Settings, and Configurations**
 - Controls
 - Return
 - Lost Connection
 - Radio
- Adjust any additional settings if necessary
 - **Sensing**
 - Flight Environment
 - Low Light mode enabled
 - NightSense, if equipped, will turn on automatically when Low Light mode is enabled
 - **Lighting**
 - Blackout mode turns off all lights on the aircraft including IR lights like the time of flight sensor and dims the controller LEDs.
 - RGB
 - Police lights (red and blue)
 - Emergency lights (red and white)
 - Navigation lights (red and green)
 - Strobe meets the FAA's requirement for anticollision lighting (visible from 3 statute miles or greater)
 - Infrared is a solid light and cannot be turned on together with strobe lights
 - DIM controller LEDS is useful during night ops
 - **Display**
 - Brightness
 - Controller screen brightness
 - Turn down at night
 - **Attachments**
 - Review status of NightSense attachments

Launch the Skydio X10D (ground)

- Respond to Low Light warnings, if applicable
- Ensure good GPS connectivity and health
- Follow normal launch procedures
 - DO NOT HAND LAUNCH IN LOW LIGHT ENVIRONMENTS

Manual Flight

Trainer will identify a notional target and have the student fly to it in manual, and perform reconnaissance.

- Manually navigate to a target without Obstacle Avoidance (if no NightSense is attached)
 - Choose the correct altitude for obstacles in the area
 - Be aware that it is the pilot's responsibility to avoid obstacles
 - Do not navigate under or near tall structures
 - GPS reception may degrade and cause the aircraft to enter Attitude Mode
 - GPS is required for low-light flight without NightSense or when flying at high altitudes
- Manually navigate to a target with Obstacle Avoidance (if equipped with NightSense)
 - Note the maximum speed of the aircraft
 - Do not navigate under or near tall structures
 - GPS reception may degrade and cause the aircraft to enter Attitude Mode
 - GPS is required for low-light flight without NightSense or when flying at high altitudes
- Once on target
 - Change to IR camera
 - Open Thermal Tools and enable Isotherm
 - Observe current temperature range on nearby scene
 - Adjust low and high temperature slider
 - Observe changes to thermal imagery
 - Return to settings, enable Spot Measuring
 - Tap on screen to enable Spot Measurement
 - Observe Spot Pip to see tool placement
 - Move Spot to other objects in the scene
 - Return to settings, enable Region of Interest
 - Move or drag ROI around the screen
 - Size RIO window to show min/ max and average temps in ROI
 - Observe high/ low "spots" within ROI
 - Open thermal camera settings
 - Change thermal mode from Recon the Inspect, observe differences
 - Change temp range to Wide, observe changes, set preference
 - Use Emissivity slider to change sensitivity, observe changes
 - Zoom out or use widget to enable Virtual Sensor
 - Use quick actions to apply AR Depth
 - Fly near obstacles to observe AR Depth on screen / remove
 - Locate object of interest for observation
 - Start/stop recording and take photo
 - Change the thermal palette
- When satisfied, have the student navigate to another notional target
 - Observe effectiveness of color sensor
 - Toggle on/off Sensor flashlight if equipped
 - Toggle on/off Spotlight if equipped

- Choose 3rd notional target and use the Fly Here now function
 - Adjust settings in flight as needed for the night mission
 - Screen Brightness
 - LED brightness
 - Aircraft lighting configuration
 - Toggle off/on NightSense
 - When NightSense is off, OA will not be available
 - Fly with Caution

Return & Land

- Manually navigate back to the landing location
 - Ensure landing area is clear
- Ensure drone is at a safe altitude (5 - 10 ft above eyeline), facing away
- Press and hold LAND button
 - Nudge to avoid obstacles as needed
- Cancel landing using pause button
- Initiate a new landing
- Observe safe landing
- Conduct normal post-flight procedures

End of Flight Card



Flight Card 5 | Map Capture

Flight Card 5 | Map Capture Missions

Duration	1 Hour
Mission Environment	Live
Requirements	• Functional X10D • Adequate Airspace
Terminal Learning Objective	• Gather imagery data to create a map
Enabling Learning Objectives	• Launch the X10D • Build a Map Capture mission • Execute a Map Capture mission
Build a Map Capture mission	

- Navigate to the 3D Scan flight mode
- Select Map Capture
- Verify preflight settings, aircraft configuration, and presets
- Begin Map Capture workflow
 - Name Map Capture
 - Place and edit Boundaries
 - Resize boundaries
 - Add Vertices
 - Move Polygon
 - Edit Setting
 - Height over Launch
 - Use to edit GSD
 - Ensure proper clearance from obstacles
 - Set the Overlap and Sidelap percentages
 - Overlap is the amount of overlap between pictures along the same path
 - Sidelap is the amount of overlap between 2 pictures along parallel paths
 - 70/70% for general use
 - The higher the overlap, the longer the mission
 - Crosshatch
 - Adds a perpendicular flight path to the mission
 - Also forces an oblique camera angle
 - Great for 3D reconstruction, but it does increase the mission time
 - Gimbal Pitch Down
 - Defaults to -90 degrees, but adjust as called for by situation
 - Perimeter
 - Adds an additional flight path around the perimeter of the scan
 - You just have to set the overlap and gimbal angle

- This setting is also great for 3D reconstructions but does add more time to the mission
- Speed
 - This sets the max speed the drone will fly throughout the mission
 - You can set anywhere between 1 and 36 mph
- Geofence
 - Enable to confine the aircraft to strictly within the map capture boundaries
 - Does not affect transit to/from map capture area.
- Stop for Photo
 - As the name suggests, forces the aircraft to stop before capturing the photo
 - Turn this on if you would like to take extra precautions to prevent motion blur
 - This will significantly increase the flight time
- Custom Flight Direction
 - Allows you to set the direction the drone flies in order to capture the imagery
 - Can be useful when scanning irregular shapes
- Perpendicular Heading
 - Allows you to offset the heading of the aircraft 90° to the left or right of the drones flight path
 - Useful when scanning solar panels
- Begin Scan
- Finish Setting Scan Settings
- View a summary of the scan (time, photos, Color GSD, and Thermal GSD)
- Map Capture missions are possible at night/with the thermal camera
 - Recommend using Low Light and ¼ resolution in camera settings
 - Camera settings are based on the color camera and not the thermal camera
 - So increase overlap and sidelap when thermal imagery is required

Preflight Brief

- Check weather
 - Ensure weather is suitable for the flight
- Check terrain
 - Understand the terrain
- Mission
 - Ensure your student understands the mission/objective for the flight
- Roles
 - Identify roles and ensure everyone understands (VO, student, RPIC, etx...)
- Emergency procedures
 - Identify where the nearest hospital is and who is responsible for dialing 911
 - Identify any personnel who may have first aid experience
 - Identify who will be responsible for recovering the aircraft in the event of a crash

- Identify any other safety procedures (fire extinguishers, emergency exits, etc...)

Execute a Map Capture

- Launch the X10D
- Monitor the mission
- Pause the mission and take manual control by selecting Stop or pressing the X key
- Resume when able

Respond to an Emergency

Drone Stuck

- If debris or moisture builds up on the lens of the nav cams, you may encounter a Drone Stuck situation
 - Flying in dusty environments or through clouds/fog can cause this
- You will receive a notification on-screen
- Troubleshoot
 - Turn off the OA
 - If in a cloud or fog, navigate out of those conditions
 - If the issue persists, return and clean the nav cam lenses
 - If the issue persists, contact support

Trainers, encourage your students to think critically about emergencies and to use best judgement

Return & Land

- The aircraft will automatically return and land when the mission is complete or when low battery is reached
- Monitor the landing and be ready to cancel in the event of an emergency
- Recover/manage media from mission

End of Flight Card



Check Ride

Check Ride

Duration	1 Hour
Mission	Live
Environment	
Requirements	• Functional X10D • Adequate Airspace
Terminal Learning Objective	• Demonstrate proficiency in launching, operating, and recovering the Skydio X10D using both manual and automated methods
Enabling Learning Objectives	• Safely prepare the X10D for flight • Launch the X10D • Execute a manual reconnaissance mission • Execute autonomous flight mode missions • Apply proper preflight and emergency procedures • Demonstrate correct use of sensor package and sensor settings • Respond to emergencies • Return and land with little to no instructor intervention
Preflight Brief	

Check Weather

- Ensure weather is suitable for the flight

Check Terrain

- Understand the terrain

Mission

- Ensure your student understands the mission/objective for the flight

Roles

- Identify roles and ensure everyone understands (VO, student, RPIC, etc...)

Emergency Procedures

- Identify where the nearest hospital is and who is responsible for dialing 911
- Identify any personnel who may have first aid experience
- Identify who will be responsible for recovering the aircraft in the event of a crash
- Identify any other safety procedures (fire extinguishers, emergency exits, etc...)

Prepare for Flight & Launch

- Power on the drone and controller
- Select the appropriate flight mode for the mission
- Conduct a Preflight inspection
- Ensure preflight settings are appropriate for the airspace/mission (sensitivity, limits, altitudes, speeds, lost

connection, and autonomous return behaviors)

- Ensure aircraft is configured for the airspace/mission (radio, lighting, button mapping, telemetry ribbon)
- Select a safe launch location
- Launch
- Simulate a launch emergency and cancel launch
- Launch for first mission

Manual Reconnaissance Flight

- Navigate to at least two distinct targets using manual controls
- Demonstrate effective use of EO and IR cameras
- Capture relevant imagery (photo or video)
- Apply proper zoom and focus controls
- Adjust EO/IR camera settings appropriately
- Explain the use of camera modes and file types
- Correctly interpret thermal imagery
- Maintain situational awareness
- Communicate clearly
- Follow all local and regulatory procedures
- Demonstrate sound judgment

***Trainer to implement/simulate a link loss and aircraft overheating (separately) and evaluate student response.* (Trainers should not purposely place the aircraft in an emergency state.)**

Autonomous Mission Execution (*Orbit, Track in Place, Scout, or Waypoints*)

- Create and review a mission plan appropriate for the selected scenario
- Execute mission with minimal input from instructor
- Demonstrate understanding of mission purpose
- Pause, resume, or modify the missions as needed
- Adjust EO/IR camera settings appropriately
- Explain use of camera modes and file types
- Capture media
- Correctly interpret thermal imagery
- Maintain situational awareness
- Communicate clearly
- Follow all local and regulatory procedures
- Demonstrate sound judgment

***Trainer to implement/simulate a lost GPS and low battery, and evaluate student response.* (Trainers should not purposely place the aircraft in an emergency state.)**

Return & Land

- Manually or autonomously return
- Initiate a landing
- Respond accurately and successfully to a simulated emergency during landing
- Recover aircraft successfully
- Conduct a post-flight examination of the aircraft
- Review and manage media captured during the mission

End of Check Ride



Grading Rubric & Eval Form

X10D Grading Rubric and Evaluation Form

Section	Criteria	Performance Description	Points Available	Scoring Guidelines
1. Preflight Preparation	Student conducts preflight checks, verifies drone readiness, and briefs the mission	• Full inspection completed without prompting (10 pts) • Minor omissions or trainer prompts (7–9 pts) • Major steps missed or poor briefing (4–6 pts) • Unsafe or unprepared (0–3 pts)	10	____ / 10
2. Manual Recon Flight	Student demonstrates control and performs reconnaissance on 2+ targets	• Smooth control, efficient navigation, good angles, clear understanding of controls (18–20 pts) • Minor issues with speed, angles, or control (15–17 pts) • Over reliance on Autonomous or Manual modes or frequent guidance required (10–14 pts) • Poor control, missed targets, unsafe operation (0–9 pts)	20	____ / 20
3. EO/IR Sensor Operation	Student adjusts EO and IR settings based on conditions; understands resolution, zoom, palettes, and image capture	• Adjusts settings intuitively; demonstrates purpose behind choices (9–10 pts) • Adjusts most settings appropriately; may need minor prompts (7–8 pts) • Adjusts with guidance; lacks understanding of application (5–6 pts) • Fails to adjust settings or misuses sensor capabilities (0–4 pts)	10	____ / 10
4. Autonomous Mission Execution	Student launches and completes an autonomous mission	• Selects and executes mission independently with clear understanding (18–20 pts) • Minor trainer input required (15–17 pts) • Needs regular guidance; misses key steps (10–14 pts) • Unable to complete or unsafe execution (0–9 pts)	20	____ / 20

5. Adaptability During Mission	Student pauses/resumes, investigates targets, and makes real-time decisions	• Confidently manages transitions between auto/manual; shows strong situational awareness (9–10 pts) • Minor hesitations or delay in decision-making (7–8 pts) • Hesitant; trainer intervention required (5–6 pts) • Unable to adapt or unsafe decisions (0–4 pts)	10	____ / 10
6. Return and Recovery	Student initiates correct return behavior; responds to simulated abort scenario; lands safely	• Executes RTH/landing with no issues (9–10 pts) • Minor correction or 1 prompt needed (7–8 pts) • Multiple prompts required or delayed reaction (5–6 pts) • Fails to return or land safely (0–4 pts)	10	____ / 10
7. Emergency Procedures	Student identifies emergency procedure, applies simulated scenario (e.g., link loss, crash, etc.)	• Identifies and applies correct response quickly (9–10 pts) • Identifies response with some hesitation (7–8 pts) • Needs coaching or is unsure (5–6 pts) • Fails to respond or applies incorrect procedure (0–4 pts)	10	____ / 10
8. Communication & Crew Resource Management (CRM)	Clear role assignment, coordination, and communication with VO or instructor or other crew members	• Communicates clearly, assigns roles, and manages crew (9–10 pts) • Minor confusion or vague instructions (7–8 pts) • Poor coordination or unclear communication (5–6 pts) • No defined roles or dangerous confusion (0–4 pts)	10	____ / 10



Master Task List

Skydio X10D Master Task List

Task	Notes
Complete a guided walkthrough of Skydio X10D	
Conduct a preflight brief	
Configure Skydio X10D settings	
Launch the Skydio X10D	
Fly to 5 different targets using manual and autonomous control methods	
Perform reconnaissance in manual control	
Perform reconnaissance in autonomous flight	
Operate the EO and IR sensors effectively	
Build and execute Orbit Point Mission	
Build and execute a Scout Mission (if applicable)	
Build and execute a Track in Place Mission	
Build and execute a GPS Waypoint mission	
Save and edit a GPS Waypoint mission	
Build a Map Capture mission	
Execute a Map Capture mission	
Respond to emergencies	
Participate in a flight debrief	



Course Schedule

Training Schedule

Day 1	Day 2
0800-0815 Course Overview	0800-0900 Day 1 Refresher
0815-0915 Getting Started	0900-1000 Written Exam & Exam Review
0915-1015 Flying Skydio X10D	1000-1015 Break
1015-1030 Break	1015-1145 Scenario 1
1030-1130 Sensor Operations	1145-1300 Lunch
1130-1230 Lunch	1300-1415 Scenario 2
1230-1300 Maintaining Skydio X10D	1415-1530 Scenario 3
1300-1400 Flight Card 1	
1400-1500 Flight Card 2	1530-1700 Culmination Flight/Check Ride
1500-1600 Flight Card 3	
1600-1700 Flight Card 4	

Notes

- Schedule is flexible and subject to change
- Breaks are ongoing during flight training



Course Syllabus

Skydio X10D Operator Course

Syllabus of Instruction

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Student-to-Instructor Ratio/Multiple Instructor Requirements

- Classroom Presentations | 4:1
- Practical Exercises | 2:1
- Flight Training Profiles | Up to 2:1

Course Description

The Skydio X10D Operator Course covers the knowledge needed to safely and effectively employ the X10D.

Course Objectives

To evaluate and certify Skydio X10D operators by ensuring they can:

- Identify the components of the Skydio X10D
- Safely launch, fly, and recover the Skydio X10D
- Plan and execute automated missions
- Leverage Paraverse for reinforcement training
- Perform field-level maintenance on the Skydio X10D system
- Perform troubleshooting measures on the Skydio X10D system

Course Prerequisites

There are no prerequisites for this course.

Learning Evaluation & Grading Criteria

Students must pass the written classroom exam and demonstrate proficiency during the culmination flight.

Course Lesson/Module Map Topics & Length

Course Lesson Map	Academic	Practical	Combined
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Skydio X10D Operator Course	Hours	Hours	Hours
Course Overview	.25		.25
Getting Started	1		1
Flying Skydio X10D	1		1.25
Sensor Operations	1		1
Maintaining Skydio X10D	.5	.5	1
Flight Card 1		1	1
Flight Card 2		1	1
Flight Card 3		1	1
Flight Card 4		1	1
Day 1 Refresher		1	1
Written Exam	.5		0.5
Scenario 1		1.5	1.5
Scenario 2		1.25	1.25
Scenario 3		1.25	1.25
Culmination Flight		1.5	1.5
	4.25	11	15.5

Task List

CTS	Objective		
1	Course Overview		
1.1	Introductions		
1.2	Course Overview		
1.3	Schedule		
1.4	More Skydio		
1.5	Questions		
2	Getting Started		

2.1	Safety		
2.2	Hardware		
2.3	System Setup		
2.4	Practical Applications		
2.5	Skydio Fleet Manager for Offline Drones		
2.6	Practical Applications		
2.7	Before You Fly		
2.8	GPS Only Flight		
2.9	Questions		
3	Flying Skydio X10D		
3.1	Global Settings		
3.2	Launching		
3.3	Flight Deck		
3.4	Flight Skills		
3.5	Returning and Landing		
3.6	Emergencies		
3.7	Paraverse		
4	Sensor Operations		
4.1	Sensors		
4.2	Media		
4.3	Map Capture		
5	Maintaining Skydio X10D		
5.1	Post Flight		
5.2	Charging		
5.3	Battery Care		
5.4	Fleet Maintenance		

5.5	Storage and Maintenance		
5.6	Support		



X10D Ground Exam w/ Answers

SKYDIO X10D OPERATOR EXAM

1. What is the maximum speed of the X10D with OA on?
a. 36 MPH c. 16 MPH
b. 45 MPH d. 22 MPH
2. What is the Close obstacle margin around the X10D?
a. ~34 in c. 2 ft
b. ~6 in d. 4 in
3. True or False: X10D can detect and avoid moving objects.
a. True **b. False**
4. If the X10D battery is below ____, launch will be prevented?
a. 32°F c. -4°F
b. 5°F d. 55°F
5. During landing, X10D will disable its obstacle avoidance at **10** feet above the landing surface.
6. When stored, after **14** days of non-use, it will self-discharge down to **50**%.
7. Skydio X10D should not be flown when winds or gusts are above **28** mph.
8. If no home point is set, where will the Skydio X10D fly in the event of a link loss?
a. Nowhere. It will hover in place. c. Skydio HQ
b. Phone's location **d. Launch location**
9. What steps should you take before each flight with your Skydio X10D? Select all that apply:
a. Inspect your drone's body to ensure it's free of damage
b. Clean all 6 navigation cameras
c. Inspect the battery to ensure it's free of damage and debris
d. Ensure all propellers are firmly attached and free of visible damage
e. Calibrate Skydio X10D's magnetometer

10. Which answer best explains variable margins?
- a. OA will dynamically reduce to allow the drone to pass through narrow spaces, and then resume OA distance settings**
 - b. The amount by which one photo includes the area covered by another photo; or, the overlap between photos on a path
 - c. An output made from photographs that consist of individual data points that are plotted in a 3D space
 - d. Variable margins are an automatic part of OA functionality and cannot be turned off
11. How long must you let the X10D dry after flight in precipitation?
- a. 20 minutes
 - b. 24 hours
 - c. 1 week
 - d. 12 hours**
12. What is the IP rating of the Skydio X10D?
- a. It's not IP rated
 - b. IP 55**
 - c. IP 54
 - d. IP
13. What is the IP rating of the Skydio X10D Controller?
- a. It's not IP rated
 - b. IP 55
 - c. IP 54**
 - d. IP
14. How many frequency bands are available on the X10D?
- a. 1
 - b. 3
 - c. 5**
 - d. 1
15. How many frequency presets can the X10D hold when DCS is toggled on?
- a. 12
 - b. 2
 - c. 20
 - d. 6**
16. How many hours are the X10D propellers rated for?
- a. 25
 - b. 100
 - c. 73
 - d. 250**
17. When should you enable Low Light mode on the X10D?
- a. Indoors
 - b. During night or low light operations**
 - c. In GPS-denied areas
 - d. When NightSense modules are attached

18. When Weak GPS Alt Limit is enabled, X10D will not be able to climb above ____ ft.
- a. Will not launch
 - b. 10 ft
 - c. **164 ft**
 - d. 400 f
19. What is the resolution of the thermal camera on X10D?
- a. **640 x 512**
 - b. 12 mp
 - c. 320 x 256
 - d. HD
20. What does the red section on the battery indicator represent?
- a. Nominal flight time left
 - b. Emergency landing
 - c. **Battery required to land**
 - d. Link loss



X10D Ground Exam Blank

SKYDIO X10D OPERATOR EXAM

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 - a. 36 MPH
 - b. 45 MPH
 - c. 16 MPH
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2. What is the Close obstacle margin around the X10D?
 - a. ~34 in
 - b. ~6 in
 - c. 2 ft
 - d. 4 in
3. True or False: X10D can detect and avoid moving objects.
 - a. True
 - b. False
4. If the X10D battery is below ____, launch will be prevented?
 - a. 32°F
 - b. 5°F
 - c. -4°F
 - d. 55°F
5. During landing, X10D will disable its obstacle avoidance at _____ feet above the landing surface.
6. When stored, after _____ days of non-use, it will self-discharge down to _____%.
7. Skydio X10D should not be flown when winds or gusts are above _____ mph.
8. If no home point is set, where will the Skydio X10D fly in the event of a link loss?
 - a. Nowhere. It will hover in place.
 - b. Phone's location
 - c. Skydio HQ
 - d. Launch location
9. What steps should you take before each flight with your Skydio X10D? Select all that apply:
 - a. Inspect your drone's body to ensure it's free of damage
 - b. Clean all 6 navigation cameras
 - c. Inspect the battery to ensure it's free of damage and debris
 - d. Ensure all propellers are firmly attached and free of visible damage
 - e. Calibrate Skydio X10D's magnetometer

10. Which answer best explains variable margins?
- a. OA will dynamically reduce to allow the drone to pass through narrow spaces, and then resume OA distance settings
 - b. The amount by which one photo includes the area covered by another photo; or, the overlap between photos on a path
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14. How many frequency bands are available on the X10D?
- a. 1
 - b. 3
 - c. 5
 - d. 1
15. How many frequency presets can the X10D hold when DCS is toggled on?
- a. 12
 - b. 2
 - c. 20
 - d. 6
16. How many hours are the X10D propellers rated for?
- a. 25
 - b. 100
 - c. 73
 - d. 250
17. When should you enable Low Light mode on the X10D?
- a. Indoors
 - b. During night or low light operations
 - c. In GPS-denied areas
 - d. When NightSense modules are attached

18. When Weak GPS Alt Limit is enabled, X10D will not be able to climb above ____ ft.
- a. Will not launch
 - b. 10 ft
 - c. 164 ft
 - d. 400 f
19. What is the resolution of the thermal camera on X10D?
- a. 640 x 512
 - b. 12 mp
 - c. 320 x 256
 - d. HD
20. What does the red section on the battery indicator represent?
- a. Nominal flight time left
 - b. Emergency landing
 - c. Battery required to land
 - d. Link loss

Scenario 1 | Perimeter Intrusion

Perimeter Intrusion Detection & Response

Objective: Train pilots to identify, track, and respond to unauthorized intrusions along the base perimeter.

Scenarios (choose one)

- A base security team receives an alert indicating a potential perimeter breach at a remote sector of the base. The drone team must launch the X10D, locate the intrusion point, and provide real-time overwatch.
- During a routine air patrol, you find an intruder/suspicious person within the perimeter in a secluded area. Launch the X10D to provide overwatch and give live and pertinent updates to the appropriate personnel.
- You were called to provide overwatch due to unauthorized personnel in a restricted area. Launch the X10D and provide pertinent and actionable information to the appropriate personnel.

Goals

- **Rapid drone deployment** and navigation along base perimeters
 - Adjust/verify Return and Flight Control settings
 - Fly Here Now to navigate to the area
- Use cameras to detect intruders
 - Target/Subject identification with thermal camera
 - Adjust thermal palette
 - Adjust color camera settings to identify the target/subject
- Coordinate with ground security teams for real-time situational awareness
 - Communicate target/subject details effectively and accurately
- Maintain geofencing to avoid restricted areas
 - Observe Keep In/Out zones

Contingencies to discuss

- Lost connection (what will the drone do and where will it fly?)
- Low battery (what will the drone do and where will it fly?)

Key Performance Indicators (KPIs)

- Time to launch
- Time to transit to the area
- Accuracy of communications
- Safety of flight
- Accuracy of answers to questions



Scenario 2 | Routine Security Patrol

Conduct Routine and Unscheduled Security Patrols

Objective: Develop proficiency in using Skydio X10D for manual and automated Security patrols.

Scenarios (choose one)

- The security team is short-staffed, and routine base perimeter patrols need reinforcement
- There is a remote section of the perimeter that is inaccessible by ground personnel. You must build a Waypoint mission for routine patrols, and conduct unscheduled patrols using the X10D

Goals

- Use cameras to detect any suspicious activity
 - Use EO and IR cameras
 - Adjust settings to see into shadows/darker areas and through light vegetation
- Coordinate with ground security teams for real-time situational awareness
 - Communicate target/subject details effectively and accurately
- Maintain geofencing to avoid restricted areas
 - Observe Keep In/Out zones

Contingencies to discuss

- Lost GPS
- Drone Stuck

Key Performance Indicators

- Set up and execute automated patrol routes
 - Emphasize free look in waypoints
- Proper manual control of the aircraft
- Analyze and interpret drone camera feeds for unusual activity
- Configure alerts for human and vehicle detection
- Ensure compliance with base operational procedures and airspace regulations

Scenario 3 | Search & Rescue

Search & Rescue (SAR) for Downed Personnel

Objective: Train pilots to assist in **locating and aiding** downed personnel within or near the base perimeter.

Scenarios (choose one)

- A security team member is missing after an off-base patrol. The drone team must deploy the X10D to conduct a search-and-rescue mission in **dense terrain**.
- An aircraft has gone down in a remote part of the base. Deploy the X10D to search for the pilots and provide assistance.

Goals

- Use **the cameras** to locate personnel in dense vegetation
 - Adjust EO and IR settings to quickly locate personnel
- Grid search techniques for **wide-area coverage**
 - **Box pattern**
 - **Raster pattern (lawn mower pattern)**
 - **Spiral pattern**
- Coordinate with ground teams for fast extraction
- Use the Spotlight (if available) to aid in the search
 - Use the Spotlight to signal to the pilot
- Use the Speaker to provide instructions to the pilots

Contingencies to discuss

- Aircraft Overheating
- Emergency Landing

Key Performance Indicators

- Proper manual control of the aircraft
- Analyze and interpret drone camera feeds for unusual activity
- Communication with ground and rescue personnel
- Ensure compliance with base operational procedures and airspace regulations