



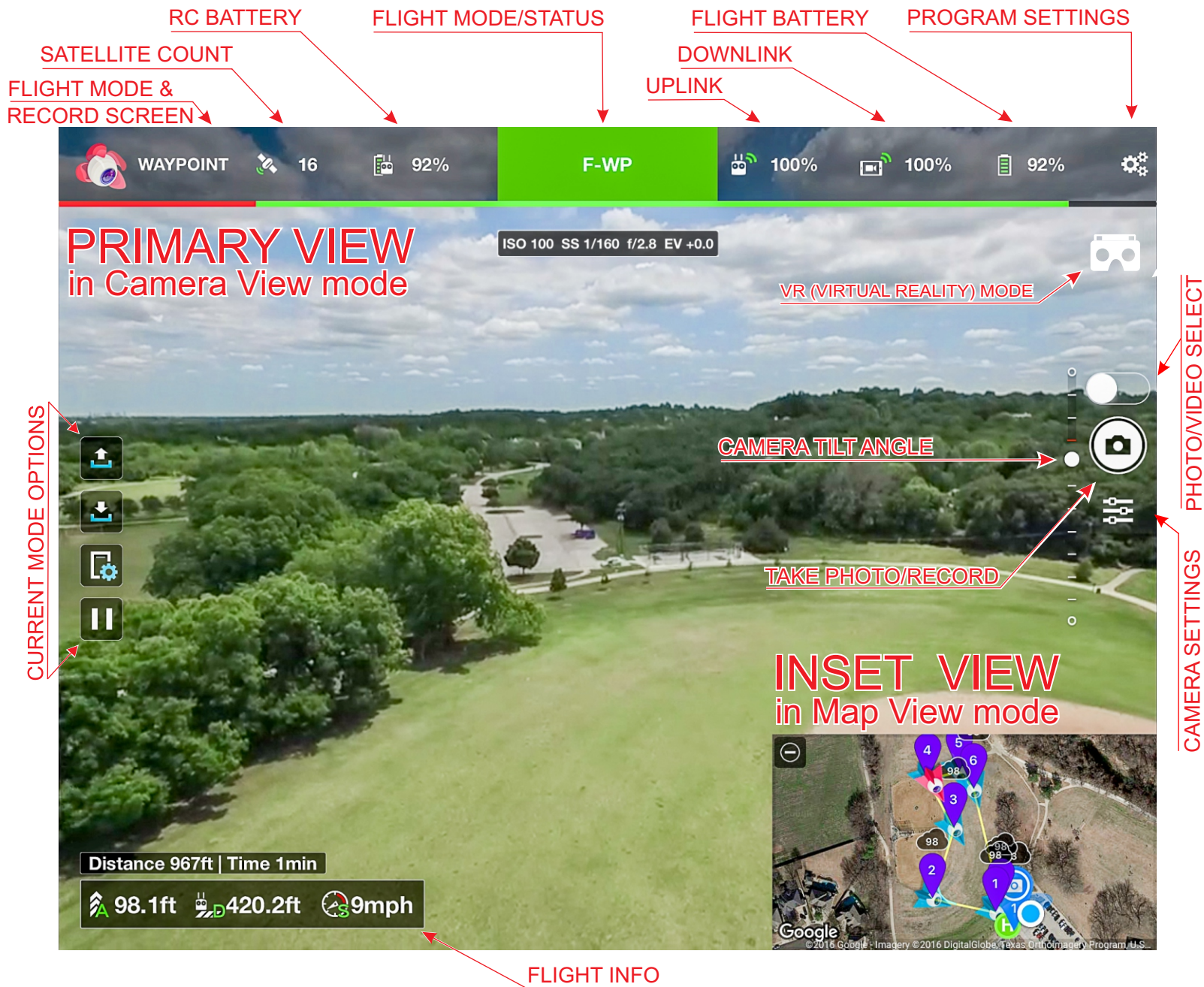
LITCHI for iOS



Litchi is a feature-rich control program for the DJI Phantom 3 Advanced & Professional, Phantom 4, and Inspire 1. Litchi offers a variety of unique capabilities to help you get the most out of your DJI aircraft.

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The Litchi Display



Litchi displays a Primary View which can be your choice of the Camera View (what your aircraft camera sees) or the Map View (showing a Google Earth view of the flying area along with positions of your aircraft, your Home Point, your mobile device, missions you have created, and more). In addition, Litchi can display a smaller Inset View, allowing you to keep track of map and camera views at the same time. You can swap views by touching anywhere within the inset view. You can collapse the inset view by touching the Collapse icon  in the inset view's upper left corner. Litchi can also display a Virtual Reality Mode  for use with virtual reality goggles.

Many of the general icons and other data presented on the Litchi Camera View and Map View screens are represented in the two graphics on this and the following page. Most are self-explanatory but several deserve a few additional remarks:



Flight Mode & Screen Record: Touching the Litchi logo in the upper left of the display opens a drop-down menu from which you can choose the Litchi mode of operation, discussed under the Flight Mode & Screen Record section in this manual.



Aircraft Position: Shows the current location of your aircraft on the map.



Mobile Device Location. Shows the current location of your mobile device (if it is GPS enabled).



Home Point: Shows the location of the Home Point on the map (by default, the location from which you took off). If you are flying, you can long-press the Home Point icon and drag it to a new location, thereby establishing a new home Point.

Map Orientation: Choose between  North Up or  Match Mobile Device Orientation.

If you will be flying your DJI aircraft in an area where internet is not available, you should cache map data for the flying area while internet is still available. You can do this by opening the Litchi app in Map View and displaying the intended flying area. When the map image is displayed at your desired zoom level, your mobile device will cache that map data so that it will be available when you arrive at the flying site.

General Settings



Program Settings

Touch the gear icon in the upper right corner of the Litchi display to adjust program settings.

- GENERAL SETTINGS

Privacy Opens the iOS App Settings window where you can view and control a variety of app access choices such as Location, Notifications, and more.

Units Choose metric or imperial

Map Type Choose Standard (road map), Satellite, or Hybrid (satellite view with road and place names)

Show Home Orientation When enabled, the Map mode displays a line connecting the Home Point and the current aircraft location.

Version Displays your Litchi version.

Help ([in blue](#)) Opens the Litchi Help page in the Litchi web site (requires internet connection).

Reset All Settings ([in blue](#)) Resets parameters to their defaults.

- AIRCRAFT SETTINGS

Go Home Altitude (meters) Enables you to view/set the aircraft Go-Home altitude (requires your aircraft to be turned on and linked to your controller)

Maximum Altitude (meters) Enables you to view/set the aircraft Maximum altitude (requires your aircraft to be turned on and linked to your controller)

HealthyDrones.com User token Allows you to enter a user token provided by the Healthy Drones website to identify your flight information uploads to them (should you choose to use their service).

HealthyDrones.com Automatic Sync If enabled, Litchi will send data about your flights to the Healthy Drones website for analysis.

Sync with HealthyDrones.com Now ([in blue](#)) Immediately syncs your recorded flight information with your HealthyDrones.com account (requires current internet connection).

Signal Lost Behavior for Manual Flying Choose Hover, Land, or Return To Home. Your choice applies when you are manually flying your aircraft only. Be aware that autonomous flight Missions you create in Litchi and upload to your aircraft will continue to fly even if the connection is lost. The Phantom 3 Standard and 4K (but not the Phantom 3 Professional) exhibit an exception to the selected Signal Lost Behavior as follows: If the control signal is lost while manually flying either of these two aircraft in the Focus or Track mode or with VR (virtual reality) immersive/Joystick Head Tracking activated, the aircraft will stop and hover, but will not Land or Return to Home.

Gimbal Extension (+30°) The gimbal pitch (which controls camera tilt) is normally adjustable between -90° (straight down) and 0° (straight ahead). If this parameter is enabled, gimbal pitch (camera tilt) can be adjusted upward to +30° (which will tend to include the front propellers in the image).

Vision Positioning System When enabled, your aircraft's Vision Positioning system is active. When disabled, the VPS system is turned off (useful when flying low over surfaces which may confuse VPS such as irregular or tilted surfaces, moving objects, over water, etc.)

Front LEDs Toggle the aircraft's red front LED lights on or off (sometimes useful to prevent glare or a red color cast when shooting in low light conditions).

Calibrate Compass (in blue) Initiates the DJI aircraft compass calibration routine (see the DJI manual for the procedure).

• CAMERA

Auto Record Select On or Off. If Auto Record is selected on, video recording will begin automatically upon takeoff and end automatically upon motor shut down after landing.

Preview Quality Choose 4, 6, 8, or 10 Mbps (megabits per second). The quality of the preview video displayed on your iOS device during flight can be controlled here. High numbers provide clearer video, but also put increased demand on your device's microprocessor (and, if selected, your graphics processor). If you suffer faltering video, try a lower Preview Quality rate.

Hardware Decoding Choose On or Off. The video stream from the aircraft must be decoded in order to see it on your iOS device. Decoding can be done using software exclusively (Hardware Decoding Off) or using the hardware GPU (graphics processing unit) in your iOS device (Hardware Decoding On). The On position may provide a smoother video display on some iOS devices.

Transmission Channel Digital communication between the controller and the aircraft can be performed on any of 32 channels. These channels use frequencies shared with other public radio services, so interference is always a possibility. Select Auto to have your DJI system choose a clear channel. Alternatively, you can select a channel you know to be interference free. You can view channel interference levels in the DJI GO app by selecting the HD menu and Image Transmission Settings.

Grid Lines Select None (default), Grid, or Grid + Diagonals. With this feature, you can display a grid pattern over your Litchi Camera View display which may help you to compose your images or video scenes. The lines will not appear in the final still images or video shot by the aircraft camera.

Gimbal Mode Select Yaw Follow (default) or FPV (First Person View). The Yaw Follow mode keeps the camera stable with respect to the horizon as your aircraft maneuvers. This is the normal mode. The FPV mode tilts the camera left or right relative to the horizon as lateral sideways movements are commanded by moving the right joystick left or right. This view is intended to simulate the experience of being airborne in your aircraft.

Format SD Card (in blue) Erases all content on the SD Card in the camera and re-formats the card.

- SPEECH

Enable Speech Select On or Off. Litchi can provide voice information and warnings.

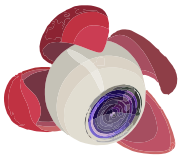
Feedback Frequency Select the frequency of voice feedback messages (from every 15 seconds up to every 60 seconds).

Altitude, Distance, Speed, and Battery Feedback Select which voice feedback messages you wish to receive.

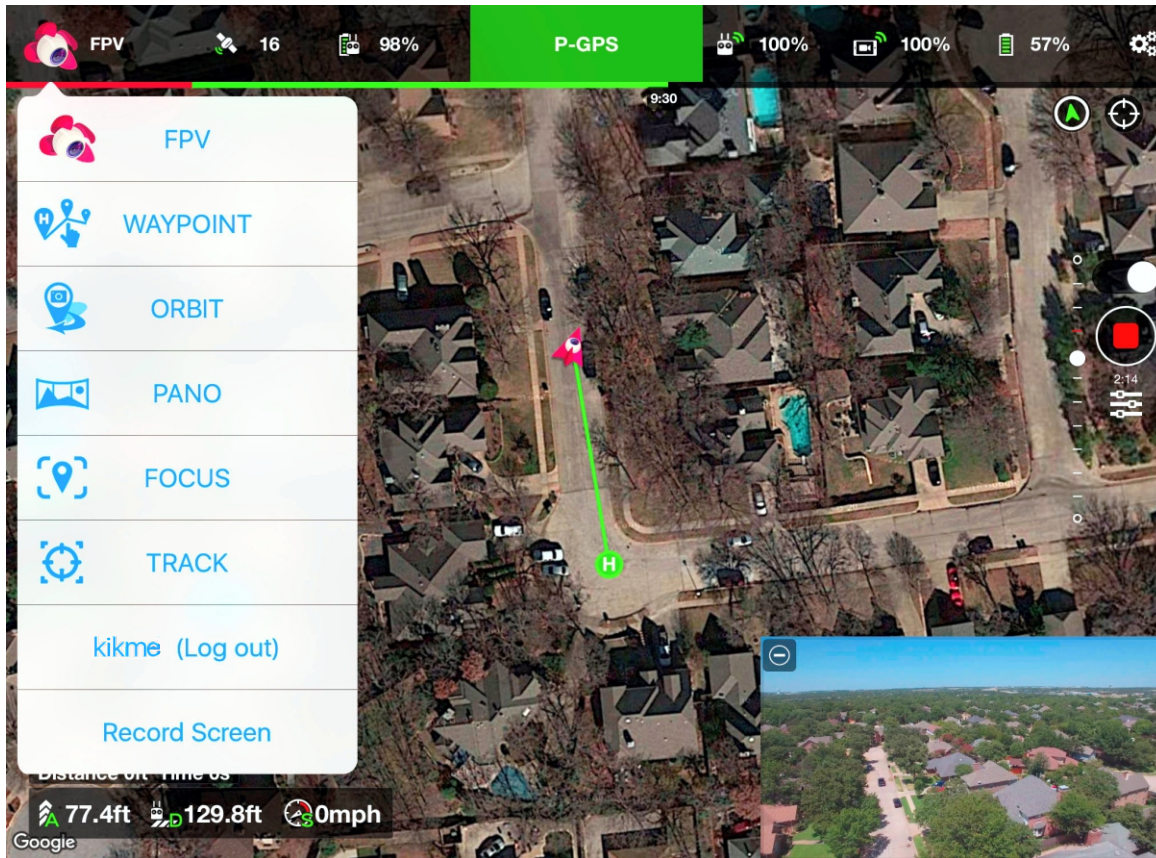
- KEYS

C1 Key (left), C2 Key (right) Allows you to assign any of a wide variety of Litchi commands to the programmable buttons on the bottom of your DJI controller.

C1 Key Long Press (left and right) Allows you to assign commands to a long press of the programmable buttons.



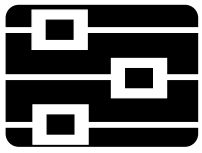
Flight Mode & Screen Record



Touch the Litchi logo in the upper left corner of the display window to toggle a drop-down menu where you can select any of a variety of Litchi modes, including “FPV” (First Person View), “Waypoint” (automatically fly a planned route), “Orbit”, “Pano” (a 360° panoramic image), “Focus” (keep the camera lens aimed at a desired point), and “Track” (keep the camera lens aimed at a desired object, even if the object is moving, using Litchi’s new “computer vision” capabilities).

The drop-down menu also allows you to log into (or out of) your Litchi Account in the internet (or to sign up for a Litchi Account).


Finally, the menu allows you to record a video of your mobile device display as you prepare a mission or fly your aircraft. Press “Start Screen Recording”, then select “Record Screen & Mic” or “Record Screen Only”. Stop the recording by pressing the Litchi logo again and selecting “Stop Screen Recording”. You can review your video from within Litchi or press “Save” in the upper right corner of your screen. You can view your saved Litchi recordings in the iOS “Photos” app, in the “Camera Roll” or “Videos” folders.

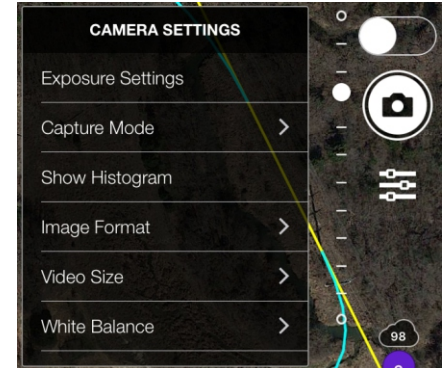


Camera Controls

and the Camera Settings Display

The current camera settings are displayed across the top of the Litchi Camera View, immediately below the Flight Mode/Status display. They include the ISO (sensitivity to light), SS (shutter speed), f (aperture setting - fixed at $f2.8$ in Phantom and Inspire 1 cameras), and EV (Exposure Value, with 0.0 as the perceived perfect exposure, positive numbers lighter, negative numbers darker). Focus information is not presented as Phantom and Inspire 1 cameras employ focus fixed at infinity.

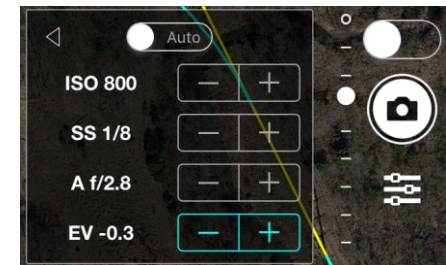
You can control Exposure Value (EV), Shutter Speed (SS), and ISO quickly and easily in real time by adjusting the Camera Settings Dial on the right rear side of the DJI controller. In addition, you can control these and many other camera options by touching the Camera Controls icon  on the right side of the Litchi display. This opens a Camera Settings window where you can scroll through the following options:



Exposure Settings

Select Auto or Manual exposure control.

If you select Auto, your camera will control ISO (light sensitivity) and SS (shutter speed) to automatically give you a good exposure. You will, however, be able to control the EV (Exposure Value) setting, resulting in images that are lighter or darker than the perceived optimum. You can control the EV value on the Auto/Manual drop-down menu or by adjusting the Camera Settings Dial on the right rear of your DJI controller. Your chosen EV setting and the resulting automatically-set ISO and Shutter Speed values will be displayed on the drop-down menu and on the Camera Settings Display at the top of the Litchi Camera View.



If you select Manual, EV adjustments will be unavailable (greyed out), but ISO and SS (Shutter Speed) will become adjustable using the Auto/Manual drop-down menu or by adjusting the Camera Settings Dial on the right back side of your DJI controller. Pressing in the Camera Settings Dial will toggle control between Shutter Speed and ISO. Your chosen settings and the resulting EV value will be displayed on the Auto/Manual drop-down menu and on the Camera Settings Display at the top of the Litchi Camera View.

Professional videographers frequently like to adjust shutter speeds to a value of “double the frame rate”. Thus, if the video frame rate is 30 fps, the desirable shutter speed would be 1/60th of a second. If the frame rate is 25 fps, the desirable shutter speed would be 1/50th of a second. You can control shutter speed in the Manual mode to a desired setting, but your EV value may be forced from +0 to some less appropriate value (over or under exposed). You may be able to force your EV value back to near +0 by adjusting the ISO value, but in strong daylight it may not be possible to achieve a perfect combination of values unless you install a neutral density filter. DJI (and some other companies) offer neutral density filters for DJI cameras.

Capture Mode

Capture mode selections are for still images. You can select 1 Shot, HDR (High Dynamic Range where a computer algorithm selects the best combination of exposures for light and dark areas and returns a combined image that is well exposed in all areas), 3 Shots, 5 shots, 7 shots or AEB (Automatic Exposure Bracketing where your camera will take several shots in rapid succession, each at a different exposure).

Show Histogram

Selecting Show Histogram displays a histogram at the bottom of the Litchi Camera View which may help to evaluate the distribution of lights and darks within your image.

Image Format (RAW, JPEG, Both)

Select the file format for saved still images, RAW, JPEG, or RAW+JPEG. Pros like to work in RAW and enhance images later using image processing software such as Adobe Photoshop or Lightroom. The advantage is that all data captured by the camera is passed along. For casual shooting, JPEG works well and produces a much smaller file. Many of the picture effects you can select in this section show up in your video and JPEG files, but not in still images saved as RAW, where effects and enhancements are added later.

Video Size

Select the frame size of your video in horizontal and vertical pixel counts and the frame rate in frames per second. Your choice will affect the pixel density and aspect ratio of your video as well as the frame rate. If you are shooting casual (unedited) video for direct display, you may wish to choose the video size that most nearly matches the device on which the video will be viewed (for instance 4K (3840 by 2160) for display on a 4K (Ultra HD) television, or 1080p for display on an HD television). If you are shooting professionally and will be editing your video in post production, you may wish to use the highest pixel density available at the frame rate you need, allowing you more latitude to zoom in or re-compose without serious image quality loss.

Here are your options:

4K (DCI 4K): The DCI (Digital Cinema Initiative) 4K standard frequently used by film and video production industries specifies a 4096 by 2160 pixel image (8.85 megapixel), resulting in a 1.9:1 wide-frame aspect ratio. With Litchi and your Phantom or Inspire, you can select this standard with a maximum of 24 progressive-frames-per-second. This is the highest pixel density option available.

4K (UHD-1): The current 4K standard for television specifies a 3840 by 2160 pixel image (8.29 megapixel), resulting in a 16:9 aspect ratio (also wide screen but *slightly* narrower than the DCI standard). With Litchi and your Phantom or Inspire, you can select this standard with either 24 or 30 progressive frames per second.

2.7K: This is a 16:9 wide-frame image 1704 by 1520 pixel (4.11 megapixel) image of somewhat reduced quality (compared to 4k) and can be selected with either 24 or 30 progressive frames per second.

1080p: This is the current HDTV standard and specifies a 1920 by 1080 pixel (2.07 megapixel) image, resulting in a 16:9 aspect ratio (wide screen). With Litchi and your Phantom or Inspire, you can select this standard with 24, 30, 48, or 60 progressive frames per second. If you select higher frame rates (such as 48 or 60) and play them back at lower frame rates (such as 24 or 30), you can achieve effective and smooth slow motion.

720p: This is the older 1280 by 720 pixel (0.92 megapixel) format for legacy televisions, resulting in a narrow screen 4:3 aspect ratio. With Litchi and your Phantom or Inspire, you can select this standard with 24, 30, 48, or 60 progressive frames per second.

White Balance

White Balance defaults to Auto. You have a variety of other options (e.g. Sunny, Cloudy, Water Surface etc. and Custom where you can select color temperatures ranging from 2000K through 10000K. If you feel that your stills or video need white balance adjustment for the existing conditions or you find occasional undesirable color temperature shifts during video shots, you may wish to select an appropriate manual white balance setting. White Balance settings affect your video and both JPEG and RAW still images.

Image Size (Aspect Ratio)

Select the aspect ratio of your still images. The choices are 4:3 and 16:9. If you are shooting casual images for direct (unedited) display on TV's or video monitors, 16:9 may be well suited, but you should be aware that this wide screen format makes no use of available camera pixels at the top and bottom of the image. Those pixels are lost. Professional still photographers may prefer to shoot in 4:3 and then choose their cropping to other aspect ratios with photo editing software, thus providing more latitude in framing the final image, making the best use of all pixels available from the DJI camera.

Digital Filter

Select from a wide variety of digital picture effects which will show up in your saved JPEG files and video shots. Digital Filter settings do not affect still images saved in the RAW format.

Sharpness

Select Standard, Hard, or Soft. Some videographers find that Soft produces video shots which appear to “flow” more smoothly, minimizing irritating moire problems across regular repeating pattern backgrounds or aliasing (stair step) problems along some straight lines. Sharpness settings affect your video and JPEG images, but not still photographs saved in the RAW format.

Contrast

Select Standard, Hard, or Soft contrast. Standard is the default setting. The effect is applied to video and JPEG still images, but not to still images saved in the RAW format. Some professional videographers prefer to shoot in soft contrast because they feel it better preserves pixels in dark areas. The contrast can be adjusted to taste later during editing.

Saturation

Choose +0, or anywhere between +3 and -3. +0 is the default setting. Saturation effects are applied to video and JPEG still images but not to still images saved in the RAW format. Some videographers prefer to reduce saturation a bit, finding the default in the Phantom and Inspire 1 cameras a bit too strong.

Hue

Choose +0 (default), or anywhere between +3 and -3. Hue effects are applied to video and JPEG still images, but not to still images saved the RAW format.

Metering Mode

Choose Center (default), Average, or Spot to determine how automatic exposure is measured. Center is a center-weighted average. Average is over the entire image. Spot allows you to touch points on the Camera View screen to set exposure based upon that point in the image. Center, the default setting, works well for most people.

AE Lock

Choose Disabled (default) or Enabled. If you are shooting video with Automatic Exposure enabled and the automatic system settles on an exposure you are happy with for your shot, you can Enable AE Lock, which will lock the existing exposure value, preventing further automatic adjustments until you Disable AE Lock. This may be an advantage if you find that the automated exposure system is “searching” too much and exposure adjustments are looking too obvious in your video footage. An alternative approach would be to simply turn off Automatic Exposure and set your own exposure choices.

Video Format

Select MOV or MP4 format for saving your video files. The MOV format is generally associated with Apple products, the MP4 format with PC products. Both Apple and PC products can, generally, read both formats and the quality of the two is, generally, considered to be equal.

Anti-Flicker

Choose Auto, 60Hz, or 50Hz. An unpleasant “flicker” effect can sometimes appear along horizontal lines when you are shooting interlaced video. An anti-flicker filter set to the power line frequency used in your country (generally 50Hz or 60Hz) can reduce the effect. Select either Auto or the power line frequency in the area where you will be shooting.

Video Standard

Choose PAL (typical in much of Europe, Africa, Australia, China and much of Asia) or NTSC (typical in much of North America, portions of South America, Japan and Korea).

File Index Mode

Select Reset (default) or Continuous. Photograph and video files saved to the micro SD card by DJI aircraft cameras are named sequentially, beginning with DJI_0001. From time to time, most people will transfer these files to a computer and delete them from the micro SD card in order to make room for new images. If you select Reset for File Index Mode, images saved to your empty card will, once again, be numbered sequentially from DJI_0001. If you select Continuous, your camera will remember the highest numbered image file from before and will begin numbering sequentially from the next higher number, even if you deleted prior files.

Adjust Gimbal Roll

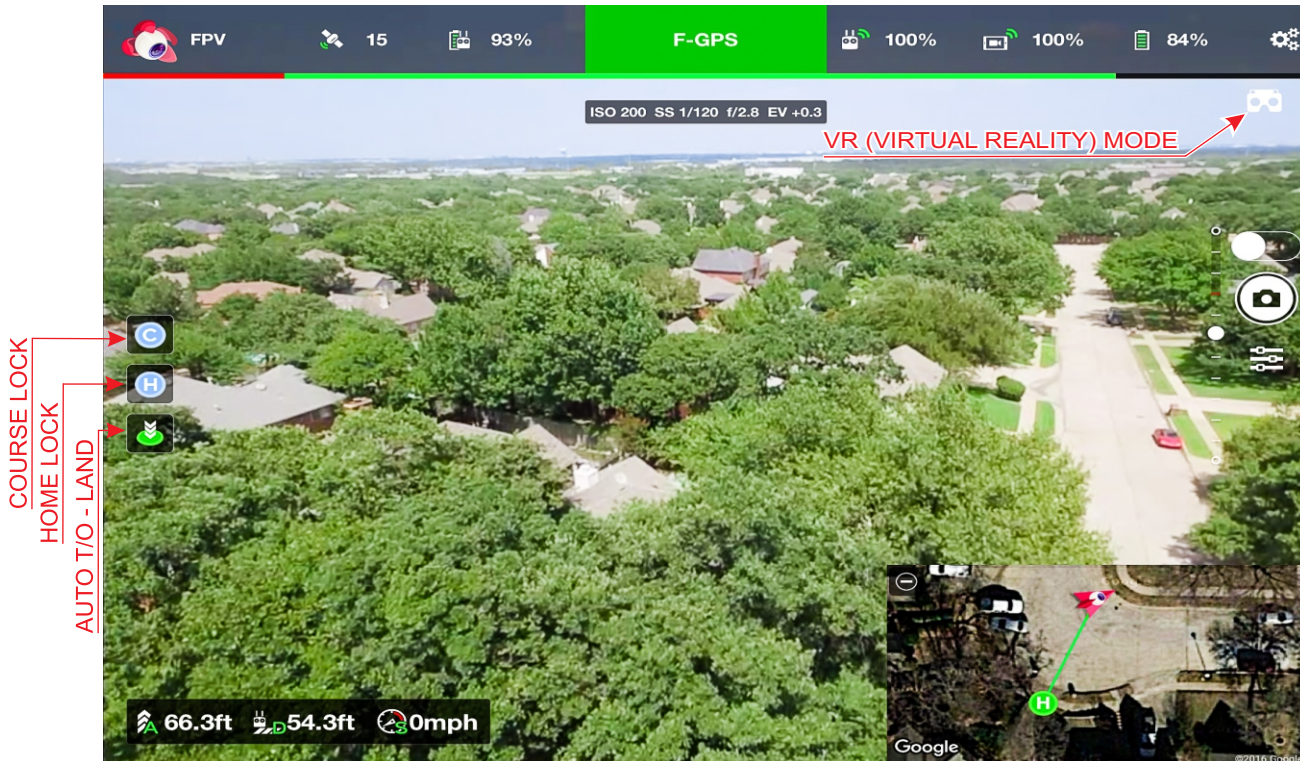
Select -0.2°, +0.2°, or Reset. If the horizon (or other horizontal line) in your shots doesn't appear quite level, you can adjust your gimbal to a perfect level with these controls. Each tap on -0.2° or +0.2° rotates the camera lens slightly until you are satisfied with the result. Tapping Reset returns the lens to its normal level position.

Shooting & Viewing Stills & Video

You can shoot still photographs or stop/start video recording using the Shutter and Video Recording buttons on your DJI controller or the Take Photo/Record button on the Litchi display. Keep in mind that Exposure Value (EV), Shutter Speed (SS), and ISO can be easily and quickly adjusted in real time using the Camera Settings Dial on the DJI controller (as well as using the Litchi Camera Settings menus on your mobile device). Monitor these values using the current camera settings display across the top of the Litchi Camera View.

You can view your recorded stills and videos from within Litchi while your aircraft is still linked to your DJI controller by pressing the Playback button on your controller and using the Camera Settings dial to browse through your recorded photos & videos. The selected photo or video will replace the Camera View image on your mobile device. All other elements of your Litchi display remain in view. To start or stop a video, press the Camera Settings Dial in.

FPV (First Person View) Mode



The FPV (First Person View) Mode allows you to hand-fly your aircraft using the DJI controller. On the left side of the display are two orientation control icons and an Auto T/O - Auto Land button:



Auto Take/Off - Auto Land may be used as an alternative to manual takeoffs and landings.

The other two buttons, **H** Home Lock and **C** Course Lock, provide you with alternative ways to maneuver your aircraft using the right controller joystick. Normally, moving the right joystick forward (up) causes your aircraft to fly straight ahead in the direction its nose is facing. Conversely, moving the joystick back (down) causes your aircraft to fly backward. Sideways movement is, likewise, relative to the direction the nose of the aircraft is facing at any given time. As you maneuver your aircraft, its nose (and, for Phantoms, the camera) is constantly pointing in different directions, potentially leading to confusion if the aircraft is far away and difficult to see.



If you engage the Home Lock mode, moving the right joystick forward (up) always flies your aircraft radially outward, directly away from the recorded Home position, regardless of the direction the nose of your aircraft may be facing. Moving it back (down) flies your aircraft directly toward Home. Sideways flight is, likewise, right or left relative to an imaginary line from Home to your aircraft.





If you engage the Course Lock mode, moving the right joystick forward (up) always flies your aircraft in the direction it was facing *when you engaged the Course Lock mode*, regardless of the direction the nose of your aircraft (and, for Phantoms, the camera) may be pointing at any given later time. Moving the joystick back (down) flies your aircraft backward relative to that initial heading. Sideways flight is, likewise, right or left relative to that initial heading. Disengaging and then re-engaging Course Lock while on a new heading will establish that new heading as the new “forward” direction of flight.

The Virtual Reality Mode

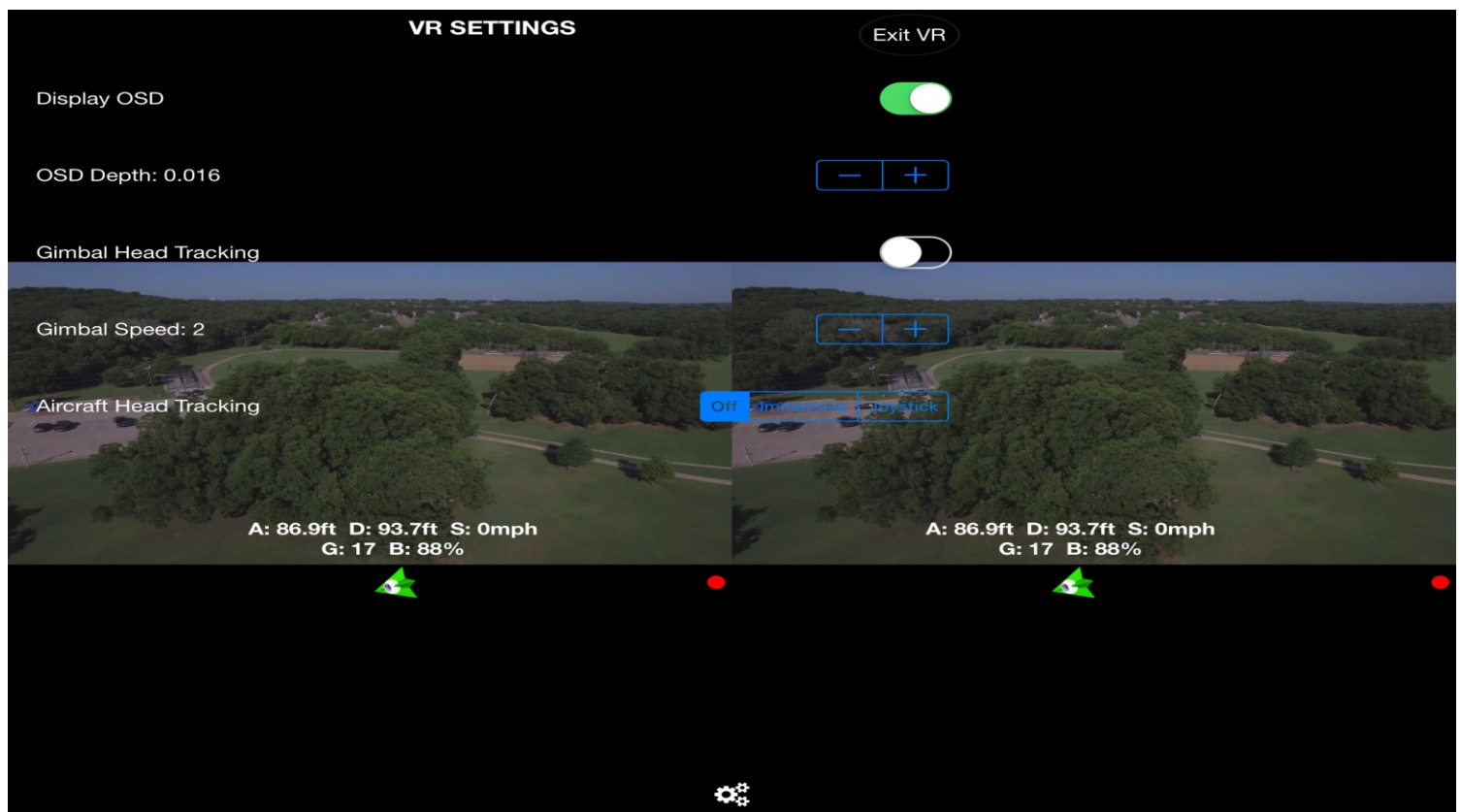
The VR (Virtual Reality) Mode allows you to use VR goggles to view what the camera on board your aircraft sees and to offer some control, through head gestures, of the camera gimbal (tilt angle) and aircraft yaw (the aircraft heading and, for Phantoms, the direction the camera points). It is intended for use with a mobile phone that you mount inside your VR goggles. The goggles contain lenses to help your eyes resolve two side-by-side images, displayed by Litchi on your phone, into an apparent single image. The images presented to the left and right eyes are slightly different, although both are derived from the single wider image captured by the camera. The result, when viewed in your VR goggles, is a simulation of what your two eyes would see if you were on board your own aircraft.



To enter the VR Mode, first turn on your aircraft. Once it is linked to your DJI controller and Litchi is displayed on your iPhone, make the Camera View primary. From within any Litchi mode except Track, touch the Virtual Reality icon  at the upper right of your display.

Touch the gear  icon at the bottom of your display to open the VR Settings options. The following options are displayed:

- Exit VR: Exits the Virtual Reality mode.
- Display OSD: Toggles the On Screen Display of altitude, distance, speed, etc.
- OSD Depth: OSD data, when toggled on and viewed through VR goggles appears to float in front of the camera image display. Experiment with the OSD Depth parameter until your eyes are able to comfortably resolve the OSD data as single floating words and numbers (no double image).
- Gimbal Head Tracking: Toggle Gimbal Head Tracking on or off. When selected on, you can control the gimbal pitch (camera tilt) by tilting your head up to point the camera forward or down to point it downward. This feature uses the solid state gyros in your mobile device. This feature requires your aircraft to be airborne and the radio controller Mode Switch (at the rear left side of your RC) to be in the F (Function) mode (except for Phantom 4 which must remain in the P mode).



- **Gimbal Speed:** Select the rate at which you would like the gimbal (lens tilt) to respond to your head movements. Higher numbers result in faster rates.
- **Aircraft Head Tracking:** Select Off, Immersive, or Joystick. When engaged, turning your head left or right will turn your aircraft (and, for Phantoms, your camera) left or right. This feature requires your aircraft to be airborne and the radio controller Mode Switch to be in the F (Function) mode (except for Phantom 4 which must remain in the P mode). If you select “Immersive”, turning your head left or right will turn the aircraft a like amount in the same direction. If you select Joystick, turning your head is the equivalent of moving the left joystick left or right - the further you turn your head, the faster the aircraft will turn.



Once you are satisfied with your VR Settings, touch the gear  icon at the bottom of your display to close the VR Settings window and return to the normal VR display. Mount your mobile phone in your VR Goggles (Pictured here is a phone being inserted into a typical pair of VR goggles which will be snapped shut once the phone is positioned inside). To achieve a good view, you may need to adjust the diopter and pupil distance controls (check your VR goggles’ instructions). You can now manually fly your aircraft using the controller joysticks and/or head gestures.



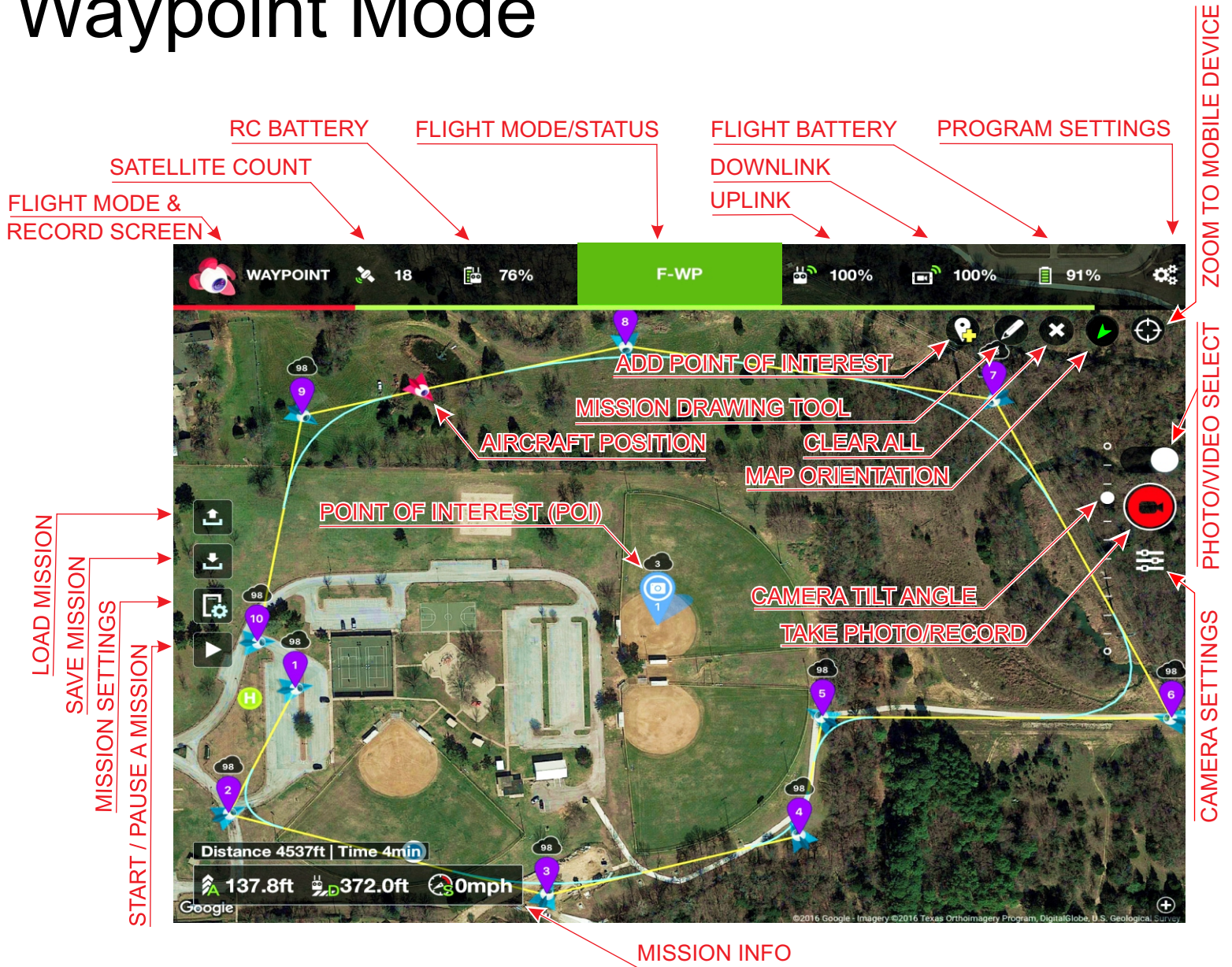


The OSD Display (On-Screen Display)

If you have enabled “Display OSD”, the view through your virtual reality goggles will provide you with some useful data which will appear to float above the Camera View background (If this data is hard to see or appears double, adjust the OSD Depth parameter in VR Settings).

A: 86.9 ft.	Altitude
D: 93.7 ft.	Distance from Home to aircraft
S: 0 mph	Speed of Aircraft
G: 17	Satellite count
B: 88%	Battery life remaining
	Recording video
	Aircraft heading relative to an imaginary line from Home to the aircraft position. If this icon is pointing straight up, the aircraft is pointing directly away from Home. If it is pointing straight down, the aircraft is pointing directly toward Home.

Waypoint Mode



Litchi's Waypoint mode allows you to create "Missions" made up of Waypoints and Points of Interest (POI's). Several parameters can be assigned to entire missions, while others can be assigned individually to waypoints. Camera moves such as lens aiming point, video recording start/stop, or shooting a photograph or panorama can be pre-programmed for individual waypoints within the mission.

The DJI GO app offers Ground Station features which are limited in that they must be employed in real time during flight. Litchi, on the other hand, allows you to *pre-program missions prior to flight*. Since options for waypoints and flight to and among them are numerous, the ability to pre-plan a mission without time constraints is extremely helpful.

Unless aborted by the pilot, Litchi missions are autonomous and will continue through completion even if the remote controller signal is lost.



Mission Settings

Mission Settings apply to entire missions and are saved with those missions. They affect aircraft activity at and between waypoints and after the last waypoint has been reached.

Heading: Defines the heading of the aircraft during the mission. Choose between **"Auto"** where the aircraft will point toward the next waypoint (i.e. point forward along the route), **"Initial"** where the aircraft will maintain the heading it had when it took off, **"Manual"** where you are able to control the heading of the aircraft during the mission using the left joystick left/right (mode 2) or **"Custom"** where the aircraft will use the heading you have defined for each waypoint. Using **"Custom"** also means that the aircraft will smoothly transition from one waypoint heading to the next.

Finish Action: Choose an action that the aircraft will perform upon arrival at the last waypoint. Available choices are **"None"**, **"RTH"** (Return to Home), **"Land"**, **"Back to 1"** (back to the first waypoint), and **"Reverse"** (fly back along the same route).

Path Mode: Choose between **"Straight Lines"** where the aircraft will go straight to each waypoint then turn, or **"Curved Turns"** where the aircraft will make smooth curved turns around, but not directly over, waypoints.

Cruising Speed: Defines the autonomous flight speed of the aircraft during the mission. This speed can be overridden during a mission by using the right joystick (mode 2). The Cruising Speed can be set to negative values if you want the aircraft to travel backwards autonomously.

Max Flight Speed: This is the maximum speed that can be commanded from the remote controller during a mission when the right joystick (mode 2) is used to *override* the autonomous Cruising Speed. The Max Flight Speed should normally be set to a value that is higher than the Cruising Speed.

Default Curve Size: The size of the curve around newly-added waypoints. Entered as a percentage of the minimum length available on either side of a new waypoint. Larger numbers result in smoother wider curves. Curve size can also be individually adjusted at each waypoint (addressed in Waypoint Settings below).

Default Gimbal Pitch Mode: Default Gimbal Pitch Mode is applied to newly added waypoints. This default mode can be changed in individual Waypoint Settings (addressed below). You can select **Disabled**, which allows the remote controller to control pitch, **Focus POI**, which automatically pitches to center the waypoint's target POI in the camera's view, or **Interpolate**, which allows camera pitch to be individually specified for each waypoint and which results in smooth camera pitch transitions between successive waypoints with specified pitch settings.

Rotations Direction: When set to Managed, aircraft heading changes from waypoint to waypoint will always use the shortest direction (clockwise/anticlockwise).

Waypoints

To add a waypoint, tap anywhere on the map (make sure that the POI toggle is not on - see Points of Interest below). You can add up to 99 waypoints. Waypoint symbols include the waypoint Number (1-99) and the programmed altitude at that waypoint.

To view or adjust waypoint settings, tap the waypoint itself. To drag a waypoint, do a long press on the waypoint, then move it around.

To delete a waypoint, tap the waypoint to open its settings, then tap the trash icon at the top left corner of the waypoint settings window.

Waypoint Settings

Each waypoint can be assigned individual parameters which will be saved with the Mission. Tap the waypoint to open the Waypoint Settings dialog.

Altitude: Waypoint altitude relative to the elevation of the aircraft where it took off.

Speed: Set the desired aircraft speed as it passes the waypoint. This parameter defaults to the Cruising Speed set in Mission Settings. For a waypoint-specific speed setting to work, your aircraft must be within range of the DJI controller. If the signal is lost, the aircraft will continue at the speed it was traveling when the signal was lost.

Curve Size: Defines the size of the curved turn at this waypoint. A bigger size means the aircraft will start the turn earlier while traveling toward this waypoint. *The Curve Size setting is ignored unless the "Path Mode" is set to "Curved Turns" in Mission Settings.* Curve Size does not apply to the first or last waypoint as there are no turns at these waypoints. The path of the curve is drawn in turquoise on the map. It will update dynamically as you adjust the curve size setting.

Heading: The desired heading of the aircraft on the compass rose (0° to 360°) as it passes a waypoint. The programmed heading at each waypoint is displayed at that waypoint by the blue aircraft icon on the map display and in the Waypoint Settings associated with that waypoint (tap on the waypoint icon). The aircraft will automatically fly the programmed heading at each waypoint *only if "Custom" heading mode is selected in Mission Settings.*

Changing a waypoint's programmed heading in Waypoint Settings (tap on the waypoint icon) also requires that "Custom" heading mode is selected in Mission Settings. Otherwise, the heading parameter will be grayed out. If "Auto", "Initial", or "Manual" is selected for heading mode in Mission settings, headings that have been programmed in waypoints will be ignored.

Rotation: When two consecutive waypoints have different headings, the aircraft will smoothly rotate from the first heading to the next. This setting defines the direction in which the aircraft will rotate, clockwise or anti-clockwise. If "Managed" was set in Mission Settings, the aircraft will always turn the shortest way to the new direction. In this case, Rotation settings are unavailable (greyed out).

Point of Interest: If you have created one or more Points of Interest (POI's), you can select which POI will be the focus as the aircraft passes a waypoint. You can also select "None".

Gimbal Pitch Mode Litchi can control the gimbal pitch (i.e. camera up/down tilt) automatically during a mission as long as the aircraft is within range of the remote controller. To specify how the gimbal pitch should be controlled, each waypoint has a Gimbal Pitch Mode setting as described below:

Disabled: Gimbal pitch will be controlled manually from the DJI remote controller (the gimbal pitch wheel) at and outbound from this waypoint.

Focus POI: Litchi will automatically control the gimbal pitch from this waypoint to the next in order to keep the selected POI in the center of the camera frame. The POI altitude will be taken into account to determine the gimbal pitch angle.

Interpolate: You can specify the gimbal pitch angle at this waypoint. If two or more waypoints have different gimbal pitch angles specified and are set to Interpolate, Litchi will automatically adjust the gimbal pitch to start and end at the specified angles and smoothly transition while traveling between the two waypoints.

Gimbal Pitch Angle: If “**Focus POI**” is set for the Gimbal Pitch Mode, the appropriate gimbal pitch angle for the target POI is automatically calculated and displayed but cannot be adjusted. If “**Interpolate**” is selected for the Gimbal Pitch Mode, you can adjust the Gimbal Pitch Angle as desired. If “**Disabled**” is selected for the Gimbal Pitch Mode, the Gimbal Pitch Angle is not displayed (as it will be controlled during flight from the R/C controller).

Actions: Each waypoint can have up to 15 different actions (as described below).

Waypoint Actions (Inactive when curved turns enabled)

Waypoint Actions are performed when the aircraft arrives at a waypoint for which you have programmed Actions. There are six different Waypoint Actions, three of which accept an additional parameter. You can add up to 15 different Actions for each waypoint.

Waypoint *Actions* are IGNORED if “Curved Turns” is selected in Mission Settings. This is because the aircraft curves *around* waypoints, never actually arriving directly *at* them, so Waypoint Actions associated with a waypoint are never initiated. If you have difficulty getting programmed Waypoint Actions to work, make sure you have selected “Straight Lines”, not “Curved turns” in Mission Settings.

Stay for: The time in seconds that the aircraft will pause at the waypoint.

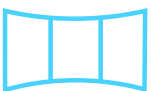
Take Photo: The camera will take a picture. This Action requires video recording to be off.

Start Recording: The camera will start video recording.

Stop Recording: The camera will stop video recording.

Rotate Aircraft: The aircraft will rotate to the specified heading (0° is North, 90° is East, 180° is South, 270° is West). For example, setting it to 135° will command the aircraft to rotate to point Southeast.

Tilt Camera: The gimbal will move to the specified angle (tilt). The valid value range is 0° (straight ahead) to -90° (straight down).



Panorama Preset: A tap on the small blue Panorama icon next to the Action settings of each waypoint will automatically add the 14 necessary Actions for a full 360° panorama made up of 7 photos (52° angle variation). The resulting 7 images will need to be combined later into one single panorama using a computer program such as Photoshop.

Ensure that the aircraft is not recording video when it arrives at a waypoint for a panorama because on Litchi Missions, still photos cannot be taken while video is being recorded. If you selected Auto Record in Litchi Settings, or if you initiated video recording manually, your aircraft may be recording video and you will need to stop recording prior to a panorama waypoint. Because a Panorama requires a series of 14 preset Actions to be inserted and the maximum number of preset Actions allowed at any waypoint is 15, it is not possible to add a Stop Recording command, a Panorama Preset series, and then a Start Recording command at any one single waypoint (too many commands). You may wish to consider adding a waypoint immediately prior to the panorama waypoint (where you can insert a stop video recording command) and another immediately after (to re-start video recording).



Points of Interest

When you place one or more Points of Interest (POI's) on the map, Litchi can automatically keep the aircraft (and therefore, for Phantoms, the camera) pointed toward the POI you have selected for that waypoint (so long as "Custom" is selected for heading mode in Mission Settings, which allows the aircraft to automatically fly headings programmed for individual waypoints). Additionally, Points of Interest enable the use of the "Focus POI" waypoint gimbal setting which automatically tilts the camera gimbal to keep the POI centered in the camera frame.

To enter POI Edit Mode, tap the POI toggle located in the top right corner of the map display. When this button is enabled, tap anywhere on the map to place a POI. The programmed headings at all existing waypoints will be automatically adjusted to target the first POI you add. If you subsequently add additional waypoints, they will automatically target the closest POI. If you have created several POI's, you can change the target POI for any waypoint in that waypoint's settings. If you wish to override the POI heading at a waypoint, you can adjust it in it's waypoint settings so long as "Custom" is selected for Heading in Mission Settings. As the mission is flown, the aircraft maintains focus on the programmed POI as it passes each waypoint. If successive waypoints target different POI's, the aircraft will smoothly turn from the first POI to the second as the aircraft travels between the two waypoints.

If you set a waypoint's Gimbal Pitch Mode to Focus POI, Litchi will automatically tilt the camera gimbal to keep the POI in view.

To drag a POI, do a long press on the POI, then move it around. This will automatically adjust the Heading setting of the waypoints that are currently targeting the POI.

To view the POI settings, tap on the POI. You will be able to adjust the POI's altitude (relative to takeoff altitude) which is used for the "Focus POI" waypoint gimbal setting.

To delete a POI, tap on the trash can icon in the top left corner of that POI's Settings window.



Drawing Tool

The drawing tool allows you to quickly setup a multi-waypoint mission by simply drawing the path you want the aircraft to follow.

To enter the drawing mode, tap the pencil icon located in the top right corner of the map. Then, draw the mission path on the map with your finger. When you are done, lift your finger from the screen and a Batch Waypoint Settings window will appear, use it to set global settings for the waypoints that will be created from the drawn path.

Loading / Saving a Mission



To save a mission, tap the “save” button in the left button bar. Enter a filename, click Ok and the mission will then be saved in the "LitchiApp/missions" folder located in the mobile device's internal storage associated with the Litchi app.



To load a mission, tap the “load” button in the left button bar, select the mission then click load.

Flying a Mission

Prior to flying a mission, tap the Camera Settings icon at the right of the Litchi display and confirm that your camera modes are as desired. Make certain there are no obstacles between the aircraft's initial position and the first waypoint. For Phantom 3 and Inspire, the flight mode switch on the controller must be in the F position (the “Function” mode) for Litchi missions to proceed autonomously. For the Phantom 4 the switch remains in the “P” position for autonomous flight. You may take off manually if you wish (with the flight mode switch in the P position). With your aircraft in a hover, change the Flight Mode Switch to the F mode (Phantom 3 & Inspire only) and then touch the "Start/Pause" button located in the left button bar on the Litchi display. You may also initiate your mission from the ground by placing the flight mode switch in the F mode (Phantom 3 & Inspire) and then touching the “Start/Pause” button.

If you receive a “Requirements Not Met” error message, confirm that your controller is definitely in the F mode (Phantom 3 & Inspire only). If you are initiating a mission from a hover, try climbing to a higher altitude or fly a little further from the takeoff point and re-try the Start/Pause button. When prompted, confirm your intent to begin the mission and your aircraft will initially climb to 6 meters (about 20 ft.) and then proceed autonomously to the first waypoint in a direct path, where the mission will commence.

Pausing a Mission

Pausing a mission can be done by tapping on the Start/Pause Mission button in the left button bar.

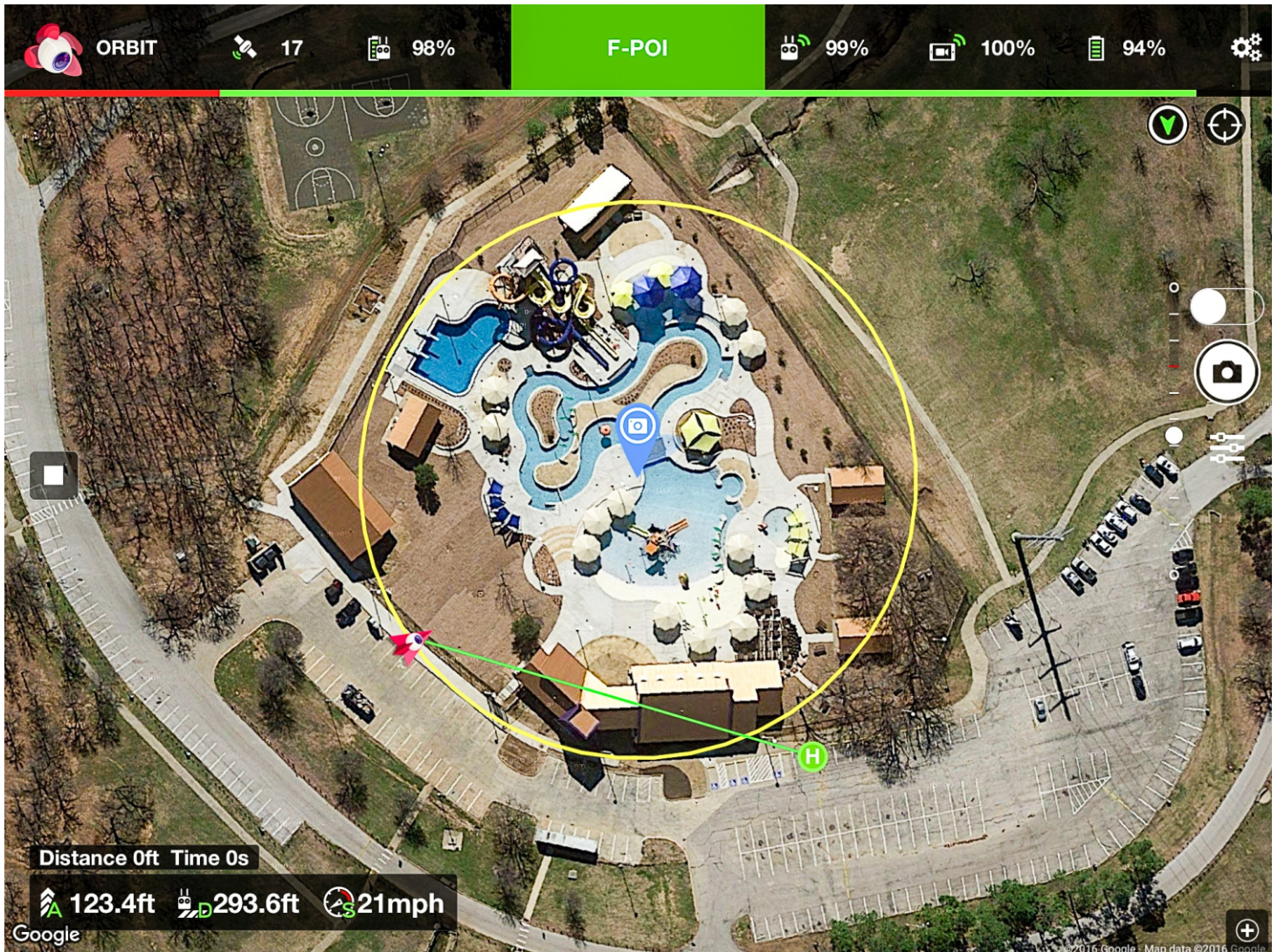
Stopping a Mission

Stopping a mission can be done by switching the RC switch from "F" to "P" or, on the Phantom 4 controller, switch from “P” to “S”.

After a Mission is Completed

Upon completing a mission, your aircraft will proceed in accordance with your Finish Action choice in Mission Settings. Video recording, if on, will stop automatically when the motors turn off.

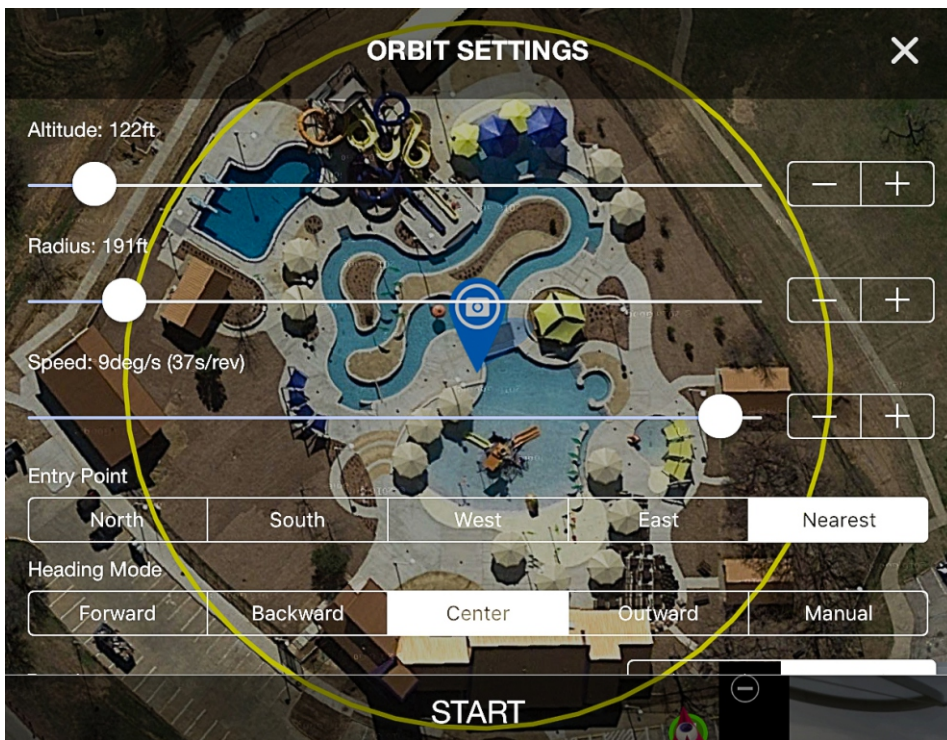
Orbit Mode



The Litchi Orbit Mode allows you to place a Point of Interest and establish an orbit around it for your aircraft to fly. You can adjust the orbit position, size, and other parameters affecting how the orbit mission will be flown and where the camera will point.

To enter Orbit Mode, touch the Flight Mode icon in the upper left of the display (Litchi logo). From the drop-down menu, select Orbit. Now touch the desired point on the map display to place a Point of Interest (POI) with an orbit around it.

To move a POI, touch and hold the POI, then drag it.



To adjust a POI's orbit parameters, tap the POI to open the Orbit Settings menu (displayed over a darkened background on your mobile device). You may need to scroll down the menu to see and adjust all of the following parameters:

Altitude	The altitude the aircraft will fly relative to the takeoff altitude.
Radius	The distance from the POI at which the aircraft will orbit.
Speed	The angular speed the aircraft will fly in degrees per second and in seconds to complete a full circle. Because the maximum forward speed of the aircraft is limited, the maximum selectable angular speed (degrees per second) will be reduced as the radius increases (resulting in a longer distance around the orbit).
Entry Point	The point on the circle where the aircraft will enter the orbit. Select from compass rose points "North", "South", "West", "East" or "Nearest".
Heading Mode	The heading the aircraft will fly (and, for Phantoms, the camera will point) as it flies around the orbit path. Select from "Forward", "Backward", "Center" (toward the POI), "Outward", or "Manual" (controlled by the remote controller).
Rotation	Select from "Anti-Clockwise" or "Clockwise" around the orbit path.
Gimbal	Select from "Manual" (controlled by the remote controller) or "Auto" (automatically set to center the POI in the camera if the Heading Mode is set to "Center"). The "Auto" mode is mostly useful when the Heading Mode has been selected to "Center". "Manual" may be more useful when the Heading Mode is set to anything else.
Subject Height	The height of the POI (relative to the takeoff altitude). This setting allows the gimbal to automatically seek the angle which centers the POI in the camera.

Flying an Orbit

Create a Litchi Orbit Mission. Make certain there are no obstacles between the aircraft initial location and the entry point for your orbit, then takeoff manually using the remote controller (takeoffs are normally performed with the Flight Mode Switch on the controller in the P position. Now, with your aircraft in a hover, change the Flight Mode Switch on the remote controller to the F position (unless you are flying a Phantom 4, which requires the switch to remain in the P position) and touch the "Start" button at the bottom of the Orbit Settings window. If you receive a "Requirements Not Met" error message and your controller is definitely in the F mode, try climbing to a higher altitude or flying a little further from the takeoff point and then re-try the "Start" button. When prompted, confirm your intent to begin the mission and your aircraft will climb to 6 meters (about 20 ft.) and then proceed autonomously to the orbit entry point in a direct path, where the orbit mission will commence.

Adjusting Orbit parameters while flying an Orbit mission:

- | | |
|-----------|--|
| Altitude: | Altitude can be adjusted during an Orbit mission using the left controller joystick (Mode 2), "up" to climb, "down" to descend. |
| Radius: | The Orbit radius can be adjusted during an Orbit mission using the right controller joystick (Mode 2). Forward (up) reduces the radius, Backward (down) increases the radius. |
| Speed: | Speed can be adjusted during an Orbit mission using the right controller joystick (Mode 2). For anti-clockwise orbiting, "Left" to increase speed, "Right" to reduce speed. For clockwise orbiting, "Right" to increase speed, "Left" to reduce speed. |

While Orbit missions have a POI around which the aircraft orbits, they do *not* have waypoints. Thus, there is no "final waypoint" at which the mission ends, so the aircraft will *continue to orbit the POI until the pilot stops the orbit mission*.

Stopping an Orbit Mission

Stop an orbit mission by switching the RC switch from "F" to "P" (for Phantom 4, switch from "P" to "S"). The aircraft will stop and hover in place. The pilot can then fly the aircraft manually or initiate a Return to Home from the R/C controller.

Saving and Loading Orbit Missions

As with Waypoint Missions, you can save  Orbit Missions and recall  saved Orbit Missions.


Failsafe

If the signal is lost between the aircraft and the remote controller, the aircraft will continue the orbit session until it reaches the critical battery level (which can be set in the DJI Go app). The aircraft will then land in place automatically, even if your failsafe is set to "Return to Home".

Pano Mode



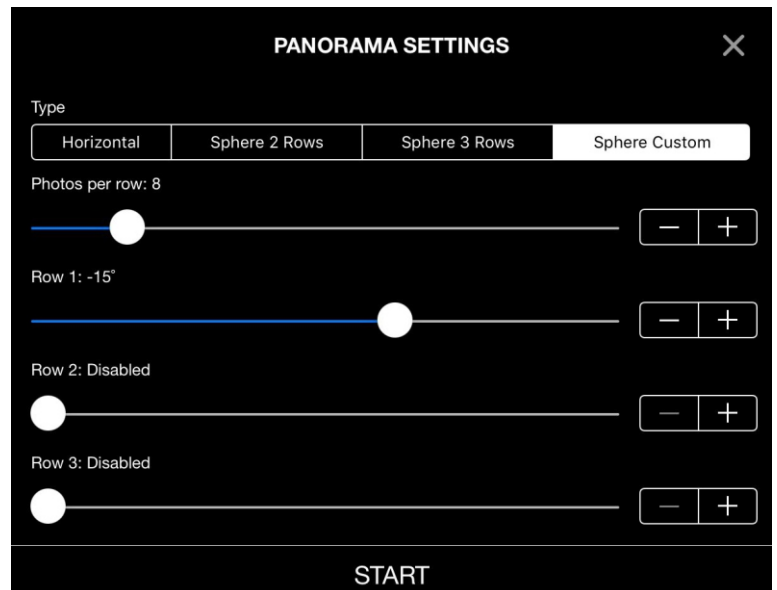
The Pano Mode allows you to hand fly your aircraft to a location and altitude of your choice from which a series of overlapping photographs can be automatically shot to form a complete 360° panoramic image. You will need to stitch the individual photos together later using a program such as Adobe Photoshop. The representative images above illustrate a series of eight still photos taken by a DJI aircraft in the Pano Mode and stitched together into a single panoramic image.

To enter Pano Mode, touch the Flight Mode icon in the upper left of the display (Litchi logo). From the drop-down menu, select Pano .

Touch the Settings icon  (left side of screen) to open the Panorama Settings window.

You can select a single horizontal row of photos, evenly spaced, to complete a full 360°, or up to 3 rows, each at a different camera tilt angle, to form a spherical panoramic image. You can also select how many photos will be taken for each row.

For additional control, you can select “Sphere Custom” which allows you to select the camera tilt angle for each of the 3 rows of photographs. By moving a selector for a row all the way to the left, you can select “Disabled” and that row of photos will be ignored. This provides a way, for example, to shoot a single row of panoramic photos *at your desired gimbal tilt angle* rather than at the single row default tilt angle (straight ahead). By scrolling down the menu, you will find controls for selecting wait times before and after each photo is taken (these default to zero seconds).



PANORAMA SETTINGS

Type: Horizontal Sphere 2 Rows Sphere 3 Rows Sphere Custom

Photos per row: 8 − +

Row 1: -15° − +

Row 2: Disabled − +

Row 3: Disabled − +

START

Shooting a Panoramic Image

Takeoff manually using the remote controller (takeoffs are normally performed with the Flight Mode Switch on the controller in the P position. Manually fly your aircraft to the point from which you wish to take the panoramic images. Now, with your aircraft in a hover, change the Flight Mode Switch on the remote controller to the F position (for Phantom 4 only, leave the switch in the P position) and touch the "Start" button at the bottom of the Panorama Settings window.

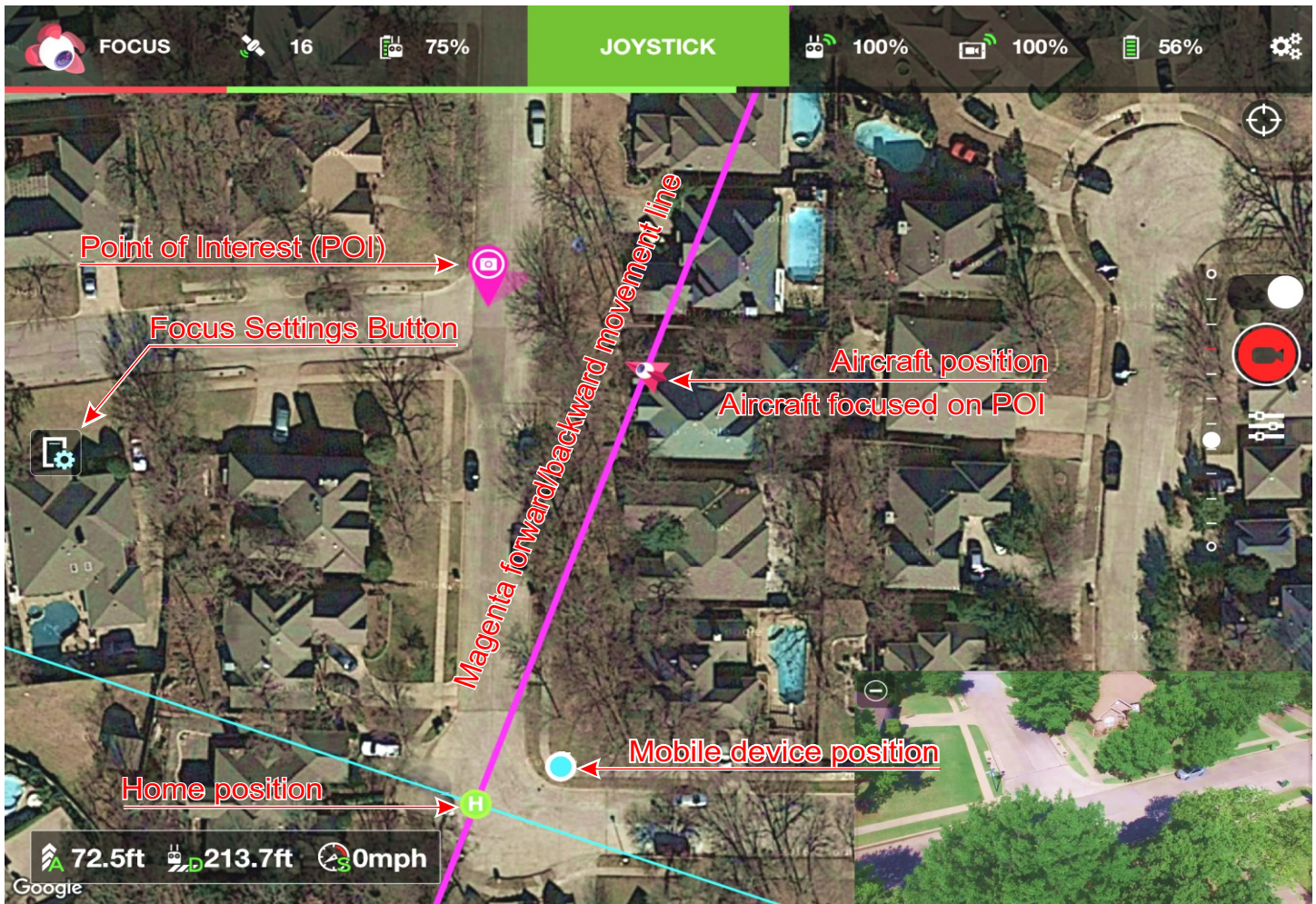
The aircraft will hover in place while taking each of the required photos for the entire panoramic sequence, after which aircraft control will be returned to you.

Terminating a Panorama Session

Should you wish to terminate a panorama session before completion, move the controller switch from F to P (or, for the Phantom 4, from P to S). The aircraft will stop and hover in place and you can fly the aircraft manually or initiate a Return to Home from the R/C controller.

Focus Mode

The Litchi Focus Mode enables your aircraft to automatically focus on (point the camera lens toward) either a Point of Interest (POI) that you have placed on the map or at the location of your mobile device (if it is GPS enabled). When in the Focus Mode, you can fly your aircraft manually and the camera will remain focused on the desired point.



To fully understand how to maneuver a multi-rotor aircraft, it is *very* important to understand an unexpected element of the way it flies. Unlike an airplane, which flies through the air in the same direction its nose is pointing (its “heading”), *a multi-rotor can fly in any direction without regard to its heading*. Therefore, a multi-rotor with a camera fixed in the forward direction (such as a Phantom) can keep its nose (and its camera) pointed toward anything the operator wishes while flying in any direction the operator wishes. It may seem, at first glance, that a camera fixed in a forward direction would be a handicap for a videographer - but it is not! Litchi allows you to fly your aircraft anywhere you wish while keeping the camera pointed anywhere you wish.

To enter the Focus mode, touch the Litchi Mode icon (Litchi logo in the upper left of your display) and select Focus.

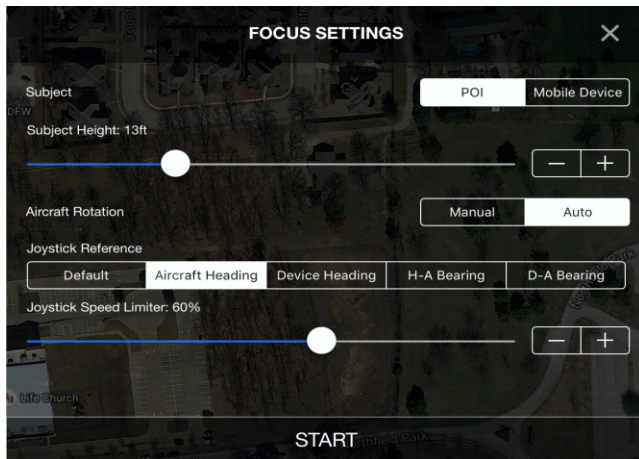


If you will be using a POI on the map, place it by touching the desired location. Only one POI at a time is permitted in Focus mode. To drag the POI to a new location, do a long press on the POI, then drag it.



Focus Settings

Touch the Focus Settings icon (on the left of the display) to open the Focus Settings window.



From the Focus Settings window, you can make the following selections:

Subject: Choose "POI" if you want your aircraft to focus on a POI placed on the map, or "Mobile Device" if you wish your aircraft to focus on your GPS enabled mobile device.

Subject Height: Enter the height of your POI above (or below) the take-off elevation, which Litchi will use to automatically and continuously adjust lens tilt between 0° (straight ahead) and 90° (straight down), in order to keep the subject in the center of the frame as the aircraft maneuvers.

Aircraft Rotation: Litchi must be able to automatically and continuously "pan" the camera lens left or right in order to keep it focused on your POI. For the Inspire, Litchi can aim the lens by rotating the camera's gimbal. For the Phantom (where the lens is fixed in the forward direction), Litchi must rotate the entire aircraft. If you are flying an Inspire, you can select "Manual" for the Aircraft Rotation mode and Litchi will rotate the gimbal (not the whole aircraft). If you are flying a Phantom, the "Auto" mode is recommended, enabling Litchi to rotate your aircraft in order to keep the POI in the camera's view.

Joystick Reference: Litchi provides several optional ways for your aircraft to respond to joystick movements in the Focus mode. Your choice may make it easier for you to maintain situational awareness as you fly your aircraft. In many of the Joystick Reference modes, Litchi places a magenta line on your map to illustrate the forward/backward direction in which the aircraft will fly as you move the right joystick forward or backward. It also places a cyan (bluish) line perpendicular to the magenta line to illustrate the left/right direction in which your aircraft will fly as you move the right joystick left or right.

You should be aware that when you hand fly your aircraft in the Focus Mode (and other hand-flying modes), the right joystick controls the *direction* your aircraft will fly through the air. Because your aircraft is subject to wind drift, the direction you fly through the air may *not be the same* as the path your aircraft flies over the ground (its track). If you've used Litchi's Waypoint mode, you have seen Litchi automatically adjust your aircraft's direction of flight in order to compensate for wind drift and keep it tracking over a pre-planned route. *When you hand fly your aircraft in the Focus mode, there is no pre-planned route over the ground, so no wind correction can be applied. Be aware of the wind! If your aircraft is not going quite where you expected, let both joysticks return to their center position and your aircraft will use GPS (or Vision Positioning) to stop and hover in place, giving you some time to sort things out.*

The Joystick Reference selections are as follows:

Default: Moving the right joystick forward causes the aircraft to fly in the direction its nose is pointed (its heading). Moving the right joystick left or right causes the aircraft to fly 90° left or right of its heading.

Phantom Notes for Default Mode

If you are flying a Phantom and you have selected "Auto" for Aircraft Rotation (typical for Phantoms), the nose of your aircraft will always be pointing toward your POI, so right joystick forward/backward commands will always fly the aircraft toward/away from your POI.

Right joystick left/right commands will always fly your aircraft in a direction 90° to the right or left of its heading. This can lead to a surprising result. As you maneuver your aircraft, the heading automatically adjusts in real time to keep the nose pointed at your POI and the direction of left or right sideways movement (as commanded by sideways joystick movement) must also constantly adjust to maintain the 90° angle to the nose. The result is that *your aircraft flies an arc around your POI*, not the straight line sideways path one might expect. On windy days, the path of the arc over the ground is likely to be distorted considerably as the arc's radius changes due to wind drift.

Left joystick left/right movement (directional control) will briefly change your Phantom's heading but the aircraft will immediately and automatically return to point at the POI, so directional inputs from the left joystick accomplish only a brief and temporary camera pan left or right.

Inspire Notes for Default Mode

If you are flying an Inspire and you have selected "Manual" for Aircraft Rotation (typical for the Inspire), the camera gimbal keeps the POI in frame without adjusting the aircraft heading. Left/right sideways movement will maintain a constant straight line direction of flight and will *not* fly an arc as a Phantom would.

You can use *left* joystick left/right commands (directional control) to point the nose of your Inspire in any direction you wish because the camera gimbal, not the aircraft, remains pointed at the POI.

The Default mode does *not* place magenta and cyan directional reference lines on the map.

Aircraft Heading: When you select the Aircraft Heading mode, Litchi records the current aircraft heading (the direction its nose is pointing) which then becomes the "forward" direction (the direction your aircraft will fly when you move the right joystick forward). Litchi places magenta and cyan directional reference lines on your map, centered through the position of the aircraft at the moment you make this selection. These reference lines are static (they remain fixed on the map as you maneuver your aircraft). The response of your aircraft to right joystick movements (forward/backward/left/right) will be parallel to (but not necessarily on) these static directional reference lines, regardless of any heading changes your aircraft may have made in order to keep your POI centered in the camera's view.

If you wish to re-orient the heading reference lines, switch your controller to the "P" mode (or, for Phantom 4, to "S") in order to temporarily interrupt the Focus mode, turn the aircraft to your new desired heading, then return your controller to "F" ("P" for Phantom 4). New heading reference lines will appear through the new location of your aircraft and in the new orientation.

Device Heading: When you select the Device Heading mode, the current heading of your mobile device becomes the “forward” direction. Litchi places the magenta and cyan directional reference lines on your map, centered through the position of your mobile device (accurate only if your device is GPS enabled) with the magenta line extending in the direction your mobile device is pointing. These reference lines are dynamic. They constantly update in order to cross over the position of your (GPS enabled) mobile device (even if you move around while flying), and they rotate as necessary to keep the magenta line pointing the same direction as your mobile device is pointed. The response of your aircraft to right joystick movements will be parallel to (but not necessarily on) these directional reference lines.

H-A Bearing (Home to Aircraft Bearing) When you select H-A Bearing, Litchi places the magenta and cyan directional reference lines on the map, crossing over the Home position with the magenta line extending over the aircraft position. The lines are dynamic and adjust as necessary to remain centered over the Home point with the magenta line dynamically updating to extend directly over the aircraft position as it maneuvers. Moving the right joystick forward (up) flies the aircraft directly away from the Home point, always ON the magenta line. Moving the stick backward (down) moves your aircraft directly back toward the home point, on the magenta line. Right joystick right/left commands cause the aircraft to fly a in a direction 90° right or left of the magenta course line (from the prospective of the Home point) and parallel to (but not necessarily on) the cyan reference line.

If you are flying a Phantom and you have selected "Auto" for Aircraft Rotation (typical for Phantoms), right joystick left/right commands can lead to the same arc flight path described earlier under *Phantom Notes for Default Mode*. Since sideways aircraft movement is always at right angles to the magenta course line, and since the magenta course line is rotating around the Home point as necessary to keep it extending over your aircraft position, sideways movement will cause your aircraft to fly an arc centered on your Home point. On windy days, the path of the arc over the ground is likely to be distorted considerably as the arc's radius changes due to wind drift.

D-A Bearing (Mobile Device-Aircraft Bearing): When you select D-A Bearing, Litchi places the magenta and cyan directional reference lines on the map, crossing over the Mobile Device position (accurate only if your mobile device is GPS enabled), with the magenta line extending over the aircraft position. The lines are dynamic and move as required to stay centered over the Mobile Device position and rotate as necessary for the magenta line to always extend over the aircraft position as it maneuvers. Moving the right joystick forward (up) flies the aircraft directly away from the mobile device location, always ON the magenta line. Moving the stick backward (down) flies your aircraft directly back toward the mobile device location on the magenta line. Right joystick right/left commands cause the aircraft to fly a in a direction 90° right or left of the magenta course line (from the prospective of the mobile device location) and parallel to (but not necessarily on) the cyan reference line.

If you are flying a Phantom and you have selected "Auto" for Aircraft Rotation (typical for Phantoms), right joystick left/right commands can lead to the same arc flight path described earlier under *Phantom Notes for Default Mode*. Since sideways aircraft movement is always at right angles to the magenta course line, and since the magenta course line is rotating around the (GPS enabled) mobile device position as necessary to keep it extending over the aircraft position, sideways movement will cause your aircraft to fly an arc centered on your mobile device position. On windy days, the path of the arc over the ground is likely to be distorted considerably as the arc's radius changes due to wind drift.

Joystick Speed Limiter: When you hand-fly your aircraft in the Focus mode, you may find that response to joystick movements is sensitive. You can mitigate this effect to some degree by selecting lower numbers for this parameter. This works only when Aircraft Rotation is enabled (the normal setting for Phantoms).

Flying in Focus Mode

Takeoff manually using the remote controller (takeoffs are normally performed with the Flight Mode Switch on the controller in the P mode. Manually fly your aircraft to the point from which you wish to initiate the Focus Mode features. Now, with your aircraft in a hover, change the Flight Mode Switch on the controller to the F position (or, for the Phantom 4, leave it in the P position) and then touch the "Start" button at the bottom of the Focus Settings window.

The aircraft will hover in place while rotating the camera gimbal (Inspires) or the entire aircraft (Phantoms) to focus on the Point of Interest. You can now use the controller joysticks to control your aircraft in accordance with the Joystick Reference mode you have selected.

GPS Accuracy: If you use the bearing-based Joystick Reference modes (Home to Aircraft bearing or Mobile Device to Aircraft bearing), you should be aware that the positional accuracy of the GPS receivers in your aircraft and your mobile device are limited. Received positions are somewhere within a circle of, perhaps, 4 or 5 meters (12 or 15 feet) and will likely shift a bit with each successive "hit" from the satellites. As a consequence, if your aircraft is near the origin reference point (where the magenta and cyan lines cross), direction of flight may become somewhat unsteady. These bearing-based modes work best when your aircraft is further away.

Compass Calibration: DJI recommends that you calibrate your aircraft compass using DJI's published procedure before flying in new locations. If you use the Device Heading mode (or any app or app-mode which uses device heading), it is important to calibrate the compass sensor in your device as well. Failure to perform this step prior to flight can lead to confusing and erroneous displays or aircraft behavior. An effective way to calibrate your device compass is to open the Litchi app (which accesses the compass sensor in your device) and then hand-maneuver your DJI controller with your device attached through a variety of directions and angles, much as a child might maneuver a toy airplane held in his hand. This allows the sensor to sample the Earth's magnetic field from a variety of directions and angles. Assuming there are no stray magnetic fields in the area, this procedure generally results in good solid device compass readings.

Terminating a Focus Session

When you wish to end a Focus session, move the controller switch from "F" to "P" (or, for Phantom 4, from "P" to "S"). The aircraft will stop and hover in place and you can then fly the aircraft manually or initiate a Return to Home from the R/C controller.

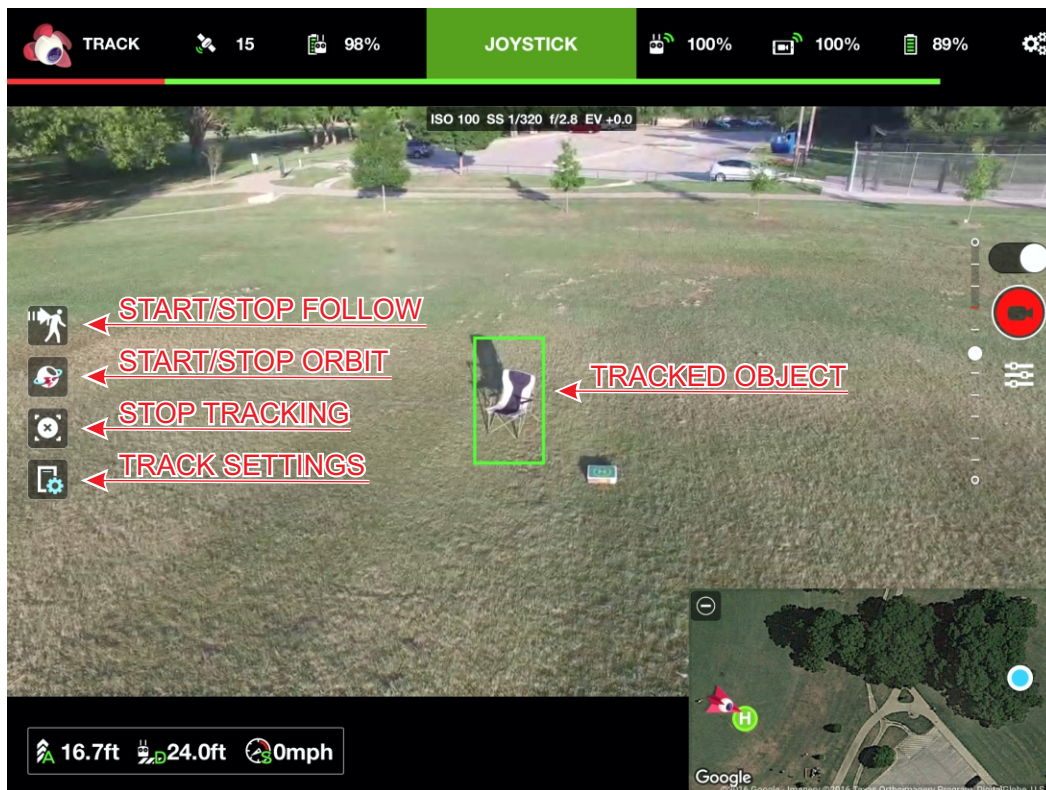
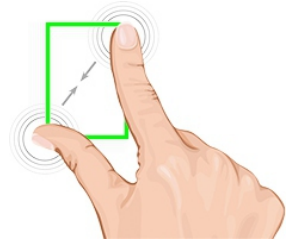
Track Mode

In the Track mode, Litchi tracks (keeps the camera focused on) an object which you have selected within the camera view. Litchi is able to maintain focus on that object even as you maneuver the aircraft or as the selected object moves about. It does this by rotating the camera gimbal (Inspire) or the entire aircraft (Phantom) in order to pan the camera left and right, and by adjusting gimbal pitch in order to tilt the lens.

In many of its other modes, Litchi maintains focus on a Point of Interest (POI) by updating the GPS locations of the aircraft and the POI. The Litchi Track mode is different in that it uses a sophisticated *computer vision* algorithm, which runs on your mobile device, to maintain focus on your selected object. While DJI introduced this capability with the Phantom 4, Litchi now makes it available for all of the DJI aircraft for which Litchi is compatible.

In addition to tracking your selected object, the Litchi Track mode offers two autonomous flight sub-modes: the ability to follow your selected object (fly along with it as it moves while keeping it within the camera's view), and the ability to orbit around your selected object while keeping it within the camera's view.

To enter the Track mode, touch the Litchi Mode icon (Litchi logo in the upper left of your display) and select Track. On your mobile device, with Camera View enabled and your controller mode switch in the F position (P position for Phantom 4), select an object to track by pinching/unpinching to form a rectangle around the object.



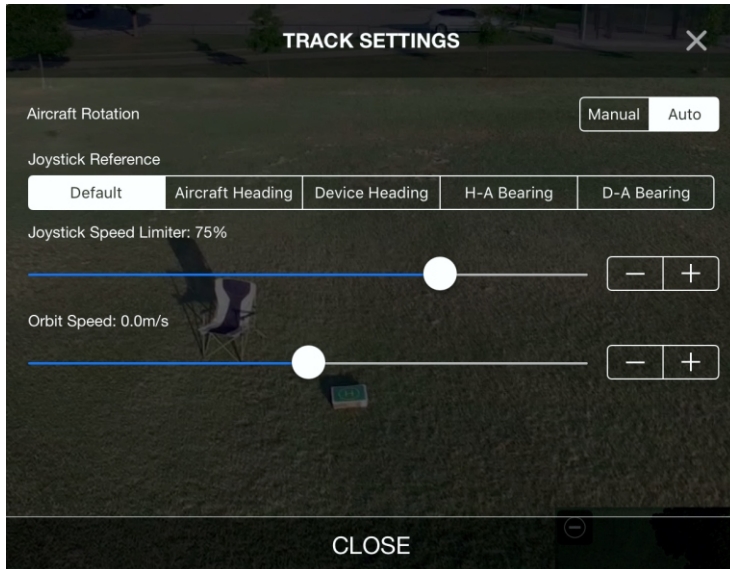
You should insure that your selected object stands out from the background in order to make it easier for Litchi to track it. There should be good contrast between your object and the background, and the background should not be cluttered. If Litchi has a good visual lock on your selection, the rectangle will be green. Orange indicates a marginal lock, and red means poor or no lock, in which case Litchi enters a search mode to attempt to re-locate your object.

Because Litchi decodes the video, runs the algorithms to track the object and renders the video all in real-time, a high performance mobile device is required. Be sure to close all background applications and screen recorders before using Track. Video lag will kill tracking.



Track Settings

Touch the Track Settings icon (on the left of the display) to open the Track Settings window.



From the Track Settings window, you can make the following selections:

Aircraft Rotation: Litchi must be able to automatically and continuously "pan" the camera lens left or right in order to keep it focused on your selected object. For the Inspire, Litchi can aim the lens by rotating the camera's gimbal. For the Phantom (where the lens is fixed in the forward direction), Litchi must rotate the entire aircraft. If you are flying an Inspire, you can select "Manual" for the Aircraft Rotation mode and Litchi will rotate the gimbal (not the whole aircraft). If you are flying a Phantom, the "Auto" mode is recommended, enabling Litchi to rotate your aircraft in order to keep the selected object in the camera's view.

Joystick Reference: Litchi provides several optional ways for your aircraft to respond to joystick movements in the Track mode. Your choice may make it easier for you to maintain situational awareness as you fly your aircraft. In many of the Joystick Reference modes, Litchi places a magenta line on your map to illustrate the forward/backward direction in which the aircraft will fly as you move the right joystick forward or backward. It also places a cyan (bluish) line perpendicular to the magenta line to illustrate the left/right direction in which your aircraft will fly as you move the right joystick left or right.

For a complete explanation of the several joystick reference modes, see the Focus section in this manual.

Joystick Speed Limiter: When you hand-fly your aircraft in the Track mode, you may find that response to joystick movements is sensitive. You can mitigate this effect to some degree by selecting lower numbers for this parameter. This works only when Aircraft Rotation is enabled (the normal setting for Phantoms).

Orbit Speed: The Litchi Track mode offers two sub-modes that enable your aircraft to fly autonomously as the camera tracks your selected object, Follow and Orbit. Here, you can set the speed your aircraft will fly in the Orbit sub-mode. It defaults to 0 m/s, so if your Orbit sub-mode doesn't appear to be working properly, check that you have set a non-zero speed here.

Flying a Track Session: A Track session is best started with your aircraft airborne in a hover. With the mode switch on your controller in the F position (P for Phantom 4), fly your aircraft into an initial position from which you can focus your camera on your intended object. With camera view selected on your mobile device, pinch/unpinch a rectangle around the object. Several options will appear on the left side of your display (see the sample image at the beginning of this section).

With a green rectangle around your selected object (Litchi has a good visual lock), your aircraft will hover in place while adjusting camera gimbal pitch and rotating the camera gimbal (Inspire) or the entire aircraft (Phantom) to maintain focus on the selected object, even if the object moves around. You can now use the controller joysticks to control your aircraft in accordance with the Joystick Reference mode you have selected.

Follow Sub-Mode: When you activate the Follow sub-mode, Litchi analyzes the image of the selected object and determines if it is moving further away (it becomes smaller as it recedes into the distance). Litchi then flies your aircraft toward the object and, as long as the object continues to move, follows the object, keeping the camera lens focused on it. The maximum aircraft speed in the Follow mode is 10 m/s (36 km/h or about 22 mph).

For optimal Follow, avoid selecting an object that is horizontally or vertically aligned with the aircraft's field of view. Follow should not be used where the terrain has elevation changes as the aircraft will not adjust its altitude should the tracked object altitude change.



To initiate the Follow sub-mode, your aircraft should be in flight with the Track mode tracking your selected object. Touch the Start/Stop Follow icon on the left side of the display.

You can control the altitude of your aircraft during a Follow session using the left joystick.

There is always some risk that, under less-than-optimal conditions, Litchi may lose track of the selected object. In this case, your aircraft will normally hover in place while it attempts to re-locate the object, but there is the possibility your aircraft may fly in unexpected directions. You should maintain a careful visual watch on your aircraft when you fly it in Follow and always be ready to regain control by switching your transmitter mode from F to P (or, for Phantom 4, from P to S).

Orbit Sub-Mode: When you activate the Orbit sub-mode, Litchi uses computer vision to orbit around your selected object, starting at the position of your aircraft when you select the Orbit mode, and maintaining an approximately constant radius. The aircraft will fly at the speed you selected in Track Settings.



To initiate the Orbit sub-mode, your aircraft should be in flight with the Track mode tracking your selected object. Touch the Start/Stop Orbit icon on the left side of the display. If your aircraft fails to begin an orbit, make sure you have selected an Orbit Speed (other than 0) in Track Settings.

During an Orbit, you can control aircraft altitude using the left joystick, and the orbit radius and orbit speed using the right joystick.



Ending a Track Session: A Track session can be terminated by touching the Stop Tracking icon on the left side of your display screen or by switching the controller mode switch from F to P (for the Phantom 4, from P to S).