DJI Mavic 3 Pro - Capture Protocol

Capture protocol and camera reference

Access notes: DJI Fly camera view; ··· = Settings. Pages refer to User Manual v1.4 (2024.08).

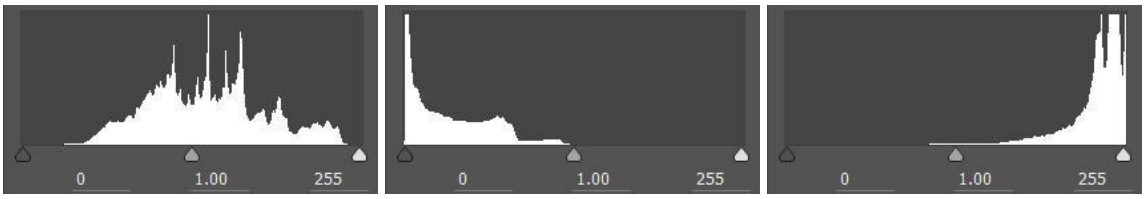
1 All Protocols

- Pro: Auto shutter + fixed ISO/aperture; adjust EV. If unavailable, use manual shutter/ISO.
  Camera Auto/Pro → Pro → exposure controls; adjust EV (p. 94).
- Preferred shutter: AUTO; monitor it throughout each pass
  Pro → exposure controls → shutter → Auto (pp. 94, 100); confirm on the connected aircraft.
- ISO 320 FIXED Increase to 640 if needed.
  Pro → exposure controls → ISO → 320; use 640 if needed (pp. 94, 105).
- Aperture f/2.8, set manually
  Pro → exposure controls → aperture (p. 94; f/2.8 range: p. 104).
- Histogram ON
  ··· → Camera → Histogram (p. 100).
- Overexposure warning ON, at the operator's discretion.
  ··· → Camera → Overexposure Warning (p. 100).
- Set the gimbal to nadir, −90°.
  Turn the gimbal dial fully down (p. 65).
- If using a polariser, capture and label a paired comparison with and without it when practical.
- Keep original files and names.

Use Pro, not full Auto, to retain fixed ISO and aperture. DJI documents Auto shutter in Pro (p. 100), but not every toggle combination. Confirm Auto shutter with ISO 320 and f/2.8 before launch. If unavailable, use manual shutter and adjust ISO for exposure; EV does not change a fully manual exposure.

Histogram quick check

Read left as dark tones and right as bright tones. A peak near or slightly right of centre can be a useful starting point, not a shape to force onto every scene. Keep important whale detail away from clipped highlights and crushed shadows; small sun-glints may still touch an edge.



Examples, left to right: useful starting point; too dark; too bright. These are schematic illustrations recovered from the original protocol, not screenshots from this aircraft.

In DJI Fly, check Camera settings for Histogram and Overexposure Warning; menu layout varies by app version. In Auto exposure, reduce EV when important bright detail clips and increase EV if the whale is too dark. In Manual exposure, adjust shutter and ISO while preserving the blur target. Recheck after changes in light or viewing direction and inspect an original test image.

2 High Altitude Survey Protocol

Settings

- wide camera at 5280 × 3956
  Tap 1×; ··· → Camera → Aspect Ratio → 4:3 (pp. 93, 100, 105).
- Capture JPEGs.
  Photo mode → ··· → Camera → Format → JPEG (pp. 100, 105).
- Interval Recording set to 2-second intervals
  Shooting Modes → Photo → Time Shot → 2 s; press shutter (pp. 93–94, 105).
- Ground speed in m/s; survey in Normal mode, no more than 15 m/s
  ··· → Control → Units → Metric (p. 99); Normal mode limits: p. 43.

Protocol

1. **Fly to the highest allowable altitude on chart 2.1.**
2. **Use the matching water-height block on chart 2.2**
3. **Follow that block right to current shutter speed**
4. **Align with the intended direction; engage Cruise Control at the chart-selected speed.**

   Using Cruise Control

   1. Set the Cruise Control Button

   Select Settings > Control > Button Customization, and then set the C1, C2 or C3 button to Cruise Control.

   2. While flying in the intended direction, press the Cruise Control button with the stick held at the desired input. Release the stick; monitor speed and track.

   3. Exit Cruise Control: Press the Cruise Control button without a control stick input.

   Manual p. 41.

5. **Monitor ground speed and shutter speed; stay within aircraft limits and the selected green cell.**
6. **Fly over and past whales**
7. **Repeat at permitted 1 cm/pixel steps from chart 2.1, down to 2 cm/pixel (73.3 m).**

Chart 2.1
Nominal GSD in 1 cm/pixel increments; heights above water

Height above water	Still cm/pixel	Nominal footprint
36.6 m	1	52.8 × 39.6 m
73.3 m	2	105.6 × 79.1 m
109.9 m	3	158.4 × 118.7 m
146.5 m	4	211.2 × 158.2 m
183.2 m	5	264.0 × 197.8 m
219.8 m	6	316.8 × 237.4 m
256.5 m	7	369.6 × 276.9 m

Charts use 1 cm/pixel steps; heights rounded to 0.1 m. Height above water ≈ takeoff-relative height + launch-to-water offset; record both. Minimum over animals: 55 m, or greater required separation. Lower rows are geometry references only.

2.2 Motion blur & overlap field reference

Ground speed	Height	Overlap 2 s	Capture GSD	1/500	1/1000	1/2000	1/4000	1/8000
4 m/s	73.3 m	90%	2 cm	0.40	0.20	0.10	0.05	0.03
9 m/s	73.3 m	77%	2 cm	0.90	0.45	0.22	0.11	0.06
15 m/s	73.3 m	62%	2 cm	1.50	0.75	0.38	0.19	0.09
4 m/s	109.9 m	93%	3 cm	0.27	0.13	0.07	0.03	0.02
9 m/s	109.9 m	85%	3 cm	0.60	0.30	0.15	0.07	0.04
15 m/s	109.9 m	75%	3 cm	1.00	0.50	0.25	0.13	0.06
4 m/s	146.5 m	95%	4 cm	0.20	0.10	0.05	0.03	0.01
9 m/s	146.5 m	89%	4 cm	0.45	0.22	0.11	0.06	0.03
15 m/s	146.5 m	81%	4 cm	0.75	0.38	0.19	0.09	0.05
4 m/s	183.2 m	96%	5 cm	0.16	0.08	0.04	0.02	0.01
9 m/s	183.2 m	91%	5 cm	0.36	0.18	0.09	0.04	0.02
15 m/s	183.2 m	85%	5 cm	0.60	0.30	0.15	0.07	0.04
4 m/s	219.8 m	97%	6 cm	0.13	0.07	0.03	0.02	0.01
9 m/s	219.8 m	92%	6 cm	0.30	0.15	0.07	0.04	0.02
15 m/s	219.8 m	87%	6 cm	0.50	0.25	0.13	0.06	0.03
4 m/s	256.5 m	97%	7 cm	0.11	0.06	0.03	0.01	0.01
9 m/s	256.5 m	93%	7 cm	0.26	0.13	0.06	0.03	0.02
15 m/s	256.5 m	89%	7 cm	0.43	0.21	0.11	0.05	0.03

Height colours are planning flags, not flight permission. Use only heights permitted for the location and operation. Blur colours: green ≤0.5 px; yellow >0.5–1 px; red >1 px.

3 Video

- Wide camera
  Tap 1× (p. 93).
- MP4 container (not ProRes)
  Video → ··· → Camera → Format → MP4 (pp. 100, 106).
- H.265
  ··· → Camera → Coding Format → H.265 (p. 100).
- Normal colour. Do not use D-Log or HLG
  ··· → Camera → Color → Normal (p. 100).
- Capture 4K UHD (3840 × 2160), 60 fps; test 3 cm/pixel at about 80 m above water
  Video → RES&FPS → 4K / 60 (pp. 94, 106).

Protocol

1. **Use the 3 cm/pixel test height (79.9 m, nominally 80 m) only where permitted.**
2. **Use the matching water-height block on chart 3.2**
3. **Follow that block right to current shutter speed**
4. **Select Cine mode, align with the intended direction, then engage Cruise Control at the chart-selected speed.**
   See “Using Cruise Control” in section 2 (manual p. 41).
5. **Monitor ground speed and shutter speed; stay within aircraft limits and the selected green cell.**
6. **Remain in Cine mode near whales.**
   Controller switch → C before engaging Cruise Control; changing modes cancels it (pp. 41, 43).
7. **Hover or SLOWLY track with whales.**
8. **Do not descend to the 2 cm/pixel row (53.3 m) while the 55 m minimum applies.**

Chart 3.1
Nominal GSD in 1 cm/pixel increments; heights above water

Height above water	Video cm/pixel
26.6 m	1
53.3 m	2
79.9 m	3
106.6 m	4
133.2 m	5
159.9 m	6
186.5 m	7

3.2 Video motion-blur field reference

Rows use exact nominal 2 and 3 cm/pixel GSD; heights are rounded to 0.1 m. The 53.3 m rows are reference only under the 55 m minimum. Video speeds are slow-tracking examples: use no more than the installed Cine-mode limit. Cells show translation blur, not photo overlap.

Ground speed Mode · height	Video GSD cm/pixel	1/500 s	1/1000 s	1/2000 s	1/4000 s	1/8000 s
1 m/s UHD 4K · 53.3 m	2.000	0.10	0.05	0.03	0.01	0.01
2 m/s UHD 4K · 53.3 m	2.000	0.20	0.10	0.05	0.03	0.01
2.8 m/s UHD 4K · 53.3 m	2.000	0.28	0.14	0.07	0.03	0.02
1 m/s UHD 4K · 79.9 m	3.000	0.07	0.03	0.02	0.01	0.00
2 m/s UHD 4K · 79.9 m	3.000	0.13	0.07	0.03	0.02	0.01
2.8 m/s UHD 4K · 79.9 m	3.000	0.19	0.09	0.05	0.02	0.01

4 Files and supporting information

Retain the original JPEGs and video clips, unchanged filenames, flight logs and SRT files when available. Link each test to a short capture log with the following information:

- Location, date, species and individual IDs where known; permissions and required credit.
- Actual height above water, launch height and any launch-to-water offset. A boat launch makes takeoff-relative altitude different from height above the water.
- Camera, mode, zoom, resolution, frame rate or still interval, exposure settings and polariser status
- Weather, lighting, glare, sea state and any operational changes or observed disturbance.

Keep each mode and height test identifiable so image quality can be compared without guessing which settings produced a file. Preserve the manual capture option while waypoint compatibility remains unresolved.

5 Mavic 3 Pro camera reference

DJI published specifications checked on 11 November 2026. All three cameras support JPEG and DNG; this capture protocol requests JPEG only. The wide main camera is the default throughout.

Specification	Main wide
Sensor	4/3 CMOS
Still resolution	20 MP 5280 × 3956
Field of view	84°
Equivalent focal length	24 mm
Aperture	f/2.8 selected (f/2.8–f/11)
Timed shooting	2 s selected

Video H265

Camera and resolution	Listed frame rates in fps
Wide (UHD 4K) 3840 × 2160	**60**

Nominal wide still and UHD 4K geometry

Camera baseline	Assumed diagonal	Image dimensions	Horizontal factor
Wide — still	84°	5280 × 3956	1.44117
Wide — UHD 4K	79.2°*	3840 × 2160	1.44117

UHD’s derived diagonal (*) assumes the full still-image width. UHD 4K (3840 × 2160) is 16:9, with a derived diagonal of 79.2°—not a separately published DJI FOV. Horizontal factor is footprint width per metre of height; UHD’s vertical factor is 0.81066. Verify the actual crop and water-relative height.

6 Conditional waypoint readiness

This is a readiness checklist and vendor-documented candidate workflow, not a procedure validated on the deployment equipment. Initial manual hover or slow-pacing tests do not depend on it. Controller-specific final steps remain conditional on confirming the actual setup.

Resolve the actual setup

- Confirm the exact aircraft and whether it is the Cine variant.
- Confirm the controller: DJI RC, DJI RC Pro or DJI RC N1, plus the phone operating system if a phone is used.
- Record the installed DJI Fly version and aircraft/controller firmware versions.
  ··· → About (p. 101).
- Identify the intended mission planner and its actual export format. Confirm a vendor-supported workflow for that exact hardware and software combination.

Access: tap Waypoint Flight at the left of camera view (pp. 37–40, 96).

Cruise Control: see “Using Cruise Control” in section 2 (manual p. 41).

DJI Fly supports native Waypoints on Mavic 3 Pro, but DJI documents no KML import or mission export. Its version 1.17 cloud-sync feature excludes the United States, so do not rely on it for Alaska. Waypoint altitude is relative to takeoff, not the water surface.

Dronelink candidate workflow

Dronelink documents a Mavic 3 Pro export route: convert the plan to onboard DJI Waypoints, then export a DJI Fly KMZ. In DJI Fly, create a clearly identified sacrificial temporary mission and back up existing missions. Only after verifying controller and operating-system file access, replace that temporary mission’s file under /Android/data/dji.go.v5/files/waypoint with the KMZ renamed to exactly the temporary file’s name. Do not replace an unrelated mission. Run the result in DJI Fly, not the Dronelink app; start interval photos manually. Converted paths or camera actions may differ. Verify the route, altitude reference, lens, camera actions, speed and failsafes before an authorized non-wildlife test. Retain the backup for rollback.

Map Pilot Pro documents a separate export-only Mavic 3 Pro workflow. Its iOS procedure differs, and Android 11 or later can restrict folder access. Do not mix the two vendors’ procedures or install APKs blindly.

Validation gate

1. Confirm coordinates, units, takeoff and water-height references, nadir view, camera actions, interval, spacing and speed for the smaller footprint.
2. Review obstacles, operating conditions, failsafes and return-to-home behaviour with the operator.
3. Compare intended and actual behaviour in an authorized non-wildlife test; inspect the files before documenting controller-specific operational steps.

The operator’s assessment of permissions, wildlife response, local aviation requirements and conditions governs whether and how a flight proceeds. No nominal altitude in this document is a clearance or an instruction to approach wildlife.

7 Explanations and field checks

This long edition retains the matching short edition’s charts and adds the explanations below. Histogram illustrations were recovered from revision 1 of the source protocol, dated 2 November 2026. This edition was assembled for review on 11 November 2026.

How to read the charts

GSD is the nominal width of one pixel at the water surface, not the smallest feature guaranteed to be identifiable. Lower height reduces the footprint and nominal GSD; it also reduces the distance travelled

between frames that can be tolerated for a given overlap. The calculations assume the wide camera at 1×, a nadir view and a flat water plane. Tilt, lens distortion, video crop, waves and uncertain height change the actual geometry.

Shutter speed, motion blur and overlap

The blur charts estimate camera translation during one exposure: blur in pixels = ground speed × exposure time ÷ GSD in metres per pixel. Green means at most 0.5 pixel, yellow means more than 0.5 through 1 pixel, and red means more than 1 pixel. These colours describe estimated translation blur; they do not establish a safe aircraft speed or account for whale motion, vibration or rolling shutter. When a faster shutter would make the image too dark, slowing the aircraft is another way to reduce blur.

Interval capture in practice

Overlap depends on the distance moved between photographs and the footprint dimension along the flight direction. With the short image dimension along track, overlap = 1 − speed × actual interval ÷ short footprint. A green blur cell alone does not guarantee enough overlap. Start the photo sequence before the observation pass, check that the counter continues, and inspect saved timestamps afterwards. A longer actual interval requires a lower speed for the same overlap. Use ordinary Photo → Time Shot at 2 s with Cruise Control for the survey. Cruise Control holds stick input, not a compass heading; monitor the track.

Exposure and the histogram

The histogram counts pixels by brightness: dark tones are on the left and bright tones on the right. The recovered illustrations show useful, very dark and very bright distributions. They are teaching examples, not target shapes for every ocean scene. Watch the whale's detail as well as the overall distribution. Overexposure stripes are helpful in bright sunlight; small glints can remain bright without requiring the whole image to become dark. A polariser can change glare and reduce available light, so label comparisons and recheck exposure after fitting or rotating it.

Height above water

The camera-to-water distance controls footprint and GSD. The controller normally reports height relative to takeoff, so a launch from a deck or shore needs an offset. That sum remains an estimate: tide, waves and sensor drift can matter. Record the launch-to-water offset and how it was obtained. A chart row is a geometric reference, not an instruction to descend toward an animal; the operator's required separation and observed wildlife response govern the pass.

Review a short test before collecting a full survey

Inspect original saved files for sharp whale detail, clipping and the expected dimensions. Check actual photo cadence and storage completeness. For video, compare framing with a still taken from the same position before treating the full-width crop assumption as measured geometry. Keep original filenames, logs and settings linked to each pass so later comparisons can separate changes in height, speed, exposure and camera mode.

Corrections and preflight validation

Corrected 11 November 2026: water-relative heights throughout; 1 cm/pixel chart increments; the 2 cm/pixel video row is below the 55 m minimum; repaired chart label; recalculated blur and overlap; still-survey

examples limited to 15 m/s and slow video examples to 2.8 m/s. Pro exposure instructions preserve the intended Auto shutter with fixed ISO and aperture. Confirm the installed app's controls, actual crop, interval cadence and flight-mode limits in a non-wildlife test before field use.

Sources

DJI Mavic 3 Pro - User Manual v1.4 (August 2024); printed page numbers match PDF pages.
https://dl.djicdn.com/downloads/DJI_Mavic_3_Pro/20240816/DJI_Mavic_3_Pro_User_Manual_EN.pdf

DJI Mavic 3 Pro specifications

DJI Waypoint Flight help

Dronelink — website and mission planner

Dronelink — onboard DJI Waypoints / KMZ export instructions

YouTube: Dronelink → DJI Fly workflow — Avios Media (linked by Dronelink)

YouTube: Create a waypoint mission from a template — Dronelink

Map Pilot Pro — KMZ export for DJI Fly

Video note: use the template tutorial for planning only; its direct Dronelink-app flight steps do not apply to Mavic 3 Pro. Use the KMZ → DJI Fly workflow above.