DJI Air 3S - Capture Protocol

Chañaral de Aceituno • Wide-camera capture and reference • 11 November 2026

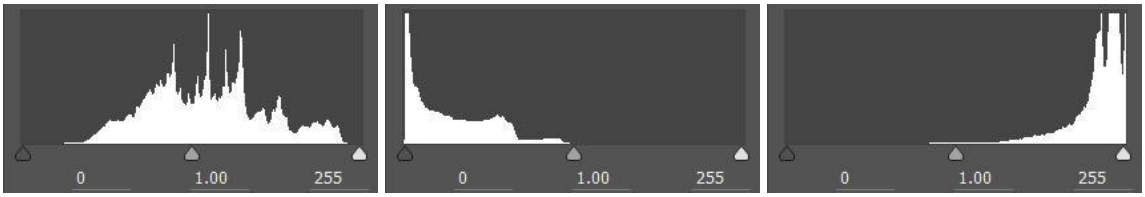
Access notes: DJI Fly camera view; ··· = Settings. Manual v1.0 (2026.04), printed/PDF pages match. * App menu paths require confirmation on the installed DJI Fly; this manual does not detail those controls.

1 All Protocols

- Use Pro with shutter and ISO set manually for repeatable tests. Auto with EV is an alternative in changing light; recheck shutter against the blur chart.
  Camera Auto/Pro toggle → Pro; Auto → EV for exposure compensation (app menu*).
- Start at 1/1000 s; use faster shutter speeds or slower flight when the blur table requires it.
  Pro → shutter → 1/1000 s (app menu*).
- Start at ISO 100; raise it as needed for exposure. With shutter and ISO both manual, adjust those controls; EV cannot change fully manual exposure.
  Pro → ISO → 100 (app menu*).
- Wide-camera aperture is fixed at f/1.8.
  No setting; fixed lens aperture (DJI specifications).
- Histogram ON
  ··· → Camera → Histogram (app menu*).
- Overexposure warning ON, at the operator's discretion. Protect whale detail; do not darken the whole image just to remove small sun-glints.
  ··· → Camera → Overexposure Warning (app menu*).
- Set the gimbal to nadir, −90°.
  Turn the gimbal dial fully down (p. 63).
- If using a polariser, capture and label a paired comparison with and without it when practical.
- Keep original files and names.

Histogram quick check

Read left as dark tones and right as bright tones. A middle peak is only a starting point; ocean scenes do not need a particular histogram shape. Protect whale detail from clipped highlights and crushed shadows. In Auto, reduce EV for important bright clipping and increase EV if the animal is too dark. In Manual, change shutter/ISO while preserving the blur target. Recheck when light or viewing direction changes.



Examples, left to right: useful starting point; too dark; too bright. These are schematic illustrations from the original protocol.

In DJI Fly, check Camera settings for Histogram and Overexposure Warning; menu layout varies by app version. Review an original test image as well as the live display.

2 High Altitude Survey Protocol

Settings

- Wide camera, 1×, 12 MP, 4:3 (expected 4096 × 3072). Verify saved dimensions.
  1× → Photo; ··· → Camera → 12 MP / 4:3 (app menu*).
- Capture JPEGs.
  Photo → ··· → Camera → Format → JPEG (app menu*).
- 12 MP JPEGs, 2 s; verify continuous capture. Optional 50 MP / 5 s test: section 6.
  Shooting Modes → Photo → Time Shot → 2 s; press shutter (app menu*).
- Use m/s and Normal mode for surveys; examples ≤12 m/s. Respect lower installed limits and conditions.
  ··· → Control → Units → Metric (app menu*). Flight modes: p. 39.

Protocol

1. **Use the highest chart 2.1 GSD step permitted for the operation within the reported 120 m ceiling; allow for height uncertainty.**
2. **Use the matching height-above-water block on chart 2.2**
3. **Follow that block right to current shutter speed**
4. **Select Normal mode first, align with the intended direction, then engage Cruise Control at a permitted chart speed.**

   Using Cruise Control

   1. Set the Cruise Control Button

   DJI RC 2: ··· → Control → Button Customization → C1 or C2 → Cruise Control. DJI RC-N3: ··· → Control → Customizable Button → Cruise Control (pp. 70, 75).

   2. Hold the desired stick input and press Cruise Control; release the stick. Monitor speed and track.

   3. Exit Cruise Control: Press the Flight Pause button once (p. 37).
5. **Start at 4 m/s. Select a speed giving ≤0.5 pixel estimated blur and ≥75% overlap. Overlap values are rounded down; slow further when needed.**
6. **Capture a straight pass including water before and after the whales, subject to the operator's wildlife protocol.**
7. **Use permitted 1 cm/pixel steps in chart 2.1. The 2 cm/pixel row is 56.9 m above water; keep an uncertainty margin above 55 m.**

Chart 2.1

Nominal still GSD in 1 cm/pixel increments

Height above water	Still cm/pixel	Nominal footprint
28.4 m	1	41.0 × 30.7 m
56.9 m	2	81.9 × 61.4 m
85.3 m	3	122.9 × 92.2 m
113.7 m	4	163.8 × 122.9 m
142.2 m	5	204.8 × 153.6 m
170.6 m	6	245.8 × 184.3 m
199.0 m	7	286.7 × 215.0 m

Heights are above water, not ASL: displayed takeoff-relative height + launch-to-water offset, with allowance for uncertainty. Retain the provisional 55 m floor and reported 120 m ceiling; confirm their applicable reference and permissions. Red height cells are reference only outside this range. Heights are rounded to 0.1 m; GSD steps are nominal.

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	56.9 m	86%	2 cm	0.40	0.20	0.10	0.05	0.03
8 m/s	56.9 m	73%	2 cm	0.80	0.40	0.20	0.10	0.05
12 m/s	56.9 m	60%	2 cm	1.20	0.60	0.30	0.15	0.07
4 m/s	85.3 m	91%	3 cm	0.27	0.13	0.07	0.03	0.02
8 m/s	85.3 m	82%	3 cm	0.53	0.27	0.13	0.07	0.03
12 m/s	85.3 m	73%	3 cm	0.80	0.40	0.20	0.10	0.05
4 m/s	113.7 m	93%	4 cm	0.20	0.10	0.05	0.03	0.01
8 m/s	113.7 m	86%	4 cm	0.40	0.20	0.10	0.05	0.03
12 m/s	113.7 m	80%	4 cm	0.60	0.30	0.15	0.07	0.04
4 m/s	142.2 m	94%	5 cm	0.16	0.08	0.04	0.02	0.01
8 m/s	142.2 m	89%	5 cm	0.32	0.16	0.08	0.04	0.02
12 m/s	142.2 m	84%	5 cm	0.48	0.24	0.12	0.06	0.03
4 m/s	170.6 m	95%	6 cm	0.13	0.07	0.03	0.02	0.01
8 m/s	170.6 m	91%	6 cm	0.27	0.13	0.07	0.03	0.02
12 m/s	170.6 m	86%	6 cm	0.40	0.20	0.10	0.05	0.03
4 m/s	199.0 m	96%	7 cm	0.11	0.06	0.03	0.01	0.01
8 m/s	199.0 m	92%	7 cm	0.23	0.11	0.06	0.03	0.01
12 m/s	199.0 m	88%	7 cm	0.34	0.17	0.09	0.04	0.02

Planning estimates: 2 s interval, short image dimension along track; overlap rounded down. Require ≥75% overlap and ≤0.5 px blur. Yellow overlap cells fail the overlap target; green blur alone is insufficient. Red height cells fall outside 55–120 m. Blur = speed × exposure time / GSD; whale motion and vibration add blur. Check actual timestamps.

3 Video

- Wide camera
  Tap 1× (app menu*).
- MP4 container
  MP4 recording container; confirm saved file extension (DJI specifications).
- H.265
  Video → ··· → Camera → Coding Format → H.265 (app menu*).
- Normal colour, H.265 (10-bit); no D-Log M or HLG. Confirm that the receiving software can decode the original clips.
  Video → ··· → Camera → Color → Normal (app menu*).
- Capture UHD 4K (3840 × 2160), 60 fps, 1×; baseline 3 cm/pixel at 80.0 m above water where permitted. Record video separately from timed photos.
  Video → resolution/frame rate → 4K / 60 (app menu*).

Protocol

1. **Use the 3 cm/pixel video row (80.0 m) where permitted, with a margin below the applicable ceiling.**
2. **Use the matching height-above-water 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 for the pass.**
   See “Using Cruise Control” in section 2 (p. 37).
5. **Start with a hover or slow pass. Use chart 3.2 only as a provisional blur estimate until video crop is checked.**
6. **Remain in Cine mode for slow tracking.**
   Controller switch → C before engaging Cruise Control; switching modes cancels it (pp. 37, 69, 75).
7. **Hover or SLOWLY track with whales.**
8. **The 2 cm/pixel video row (53.3 m) is reference only: below the retained 55 m floor.**

Chart 3.1 — Nominal video GSD in 1 cm/pixel increments

Height above water	Video cm/pixel
26.7 m	1
53.3 m	2
80.0 m	3
106.6 m	4
133.3 m	5
159.9 m	6
186.6 m	7

3.2 Provisional video motion-blur reference

Nominal full-width 4K/60 geometry: verify crop against a still from the same position. Rows use exact 2 and 3 cm/pixel GSD. Speeds of 1, 2 and 2.8 m/s are slow-tracking examples, not Cine limits; use the lower of the example, installed mode limit and conditions. Cells show translation blur, not 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 · 80.0 m	3.000	0.07	0.03	0.02	0.01	0.00
2 m/s UHD 4K · 80.0 m	3.000	0.13	0.07	0.03	0.02	0.01
2.8 m/s UHD 4K · 80.0 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. Check a short sequence before surveying: 12 MP JPEGs (expected 4096 × 3072), actual spacing, sharpness and complete storage. If the cadence or dimensions differ, recalculate the table values.

5 DJI Air 3S camera reference

Two cameras: this protocol uses only the 24 mm-equivalent wide camera at 1×. The 70 mm medium tele camera at 3× needs different geometry. Baseline: 12 MP/2 s; optional 50 MP/5 s detail test. Published specifications checked 11 November 2026.

Specification	Main wide
Sensor	1-inch CMOS
Still resolution	12 MP: expected 4096 × 3072; 50 MP: 8192 × 6144
Field of view	84°
Equivalent focal length	24 mm
Aperture	f/1.8
Timed shooting	12 MP: 2/3/5/7/10/15/20/30/60 s; 50 MP: 5/7/10/15/20/30/60 s

Video — H.265

Camera and resolution	Protocol frame rate (fps)
Wide (UHD 4K) 3840 × 2160	**60**

Nominal still and provisional UHD 4K geometry

Camera baseline	Assumed diagonal	Image dimensions	Horizontal factor
Wide — still	84°	4096 × 3072*	1.44065
Wide — UHD 4K	79.1°*	3840 × 2160	1.44065

Nominal calculation: width/height factor = 2 × tan(84°/2) × 4/5 = 1.44065; still vertical factor = 1.08048. GSD = 100 × height × 1.44065 / 4096 cm/pixel. *12 MP dimensions are the working half-width/half-height assumption from the published maximum; verify an original file. Video assumes full-width 16:9, not a verified mode-specific FOV. Nadir view and flat water are assumed.

6 Interval capture and automation checks

Baseline: manual passes with 12 MP Timed Shot JPEGs. This Air 3S adaptation has not been demonstrated on the team's aircraft.

Resolve the actual setup

- Susannah mentions Air 3/3S aircraft in the email thread. Confirm DJI Air 3S on the actual aircraft before using this document; Coni's Mavic Air 2 is a different model.
- Record the actual controller, phone if used, operating system, app and firmware. Confirm the exact combination supports the chosen capture workflow.
- Record the installed DJI Fly version and aircraft/controller firmware versions.
  ··· → About (app menu*).
- If using automation, identify the mission planner and verify its support for this exact aircraft and controller. Manual capture remains the baseline.

The email reports a 120 m maximum and fieldwork from 22 November to 9 December 2026. Confirm the applicable permit conditions and height reference with the operator. This document uses that reported ceiling; it does not independently establish Chilean flight permissions.

Optional high-resolution interval test

The 50 MP wide-camera mode supports timed capture from 5 s. At the same height its nominal GSD is half the 12 MP value, while the footprint is unchanged; this does not prove twice the resolved detail. At 5 s, use 40% of a 2 s speed to retain the same overlap. Example: 4 m/s becomes 1.6 m/s. Recompute blur with the smaller GSD and inspect real files. Do not apply the 2 s overlap column unchanged.

DJI Air 3S supports native Waypoint Flight in DJI Fly. Validate lens, nadir, speed, height reference, camera action and continuous interval capture on a non-wildlife test. Do not reuse Mavic 3 Pro KMZ file-replacement steps. DJI does not document KML route import for this model.

Tap Waypoint Flight at the left of camera view (pp. 35–36).

Validation gate

1. Confirm 12 MP, 4:3, JPEG, 1×, nadir, actual interval, water-relative height estimate, shutter speed and storage before a pass.
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.

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.

Sources and adaptation record

DJI Air 3S specifications - https://www.dji.com/air-3s/specs

DJI Air 3S - User Manual (v1.0, April 2026) - https://dl.djicdn.com/downloads/DJI_Air_3S/UM/20260423/DJI_Air_3S_um_en1.pdf

Email basis: Re: Collaborations from Chañaral de Aceituno!, Ted / Coni / Susannah, 11 November 2026.

Email thread — https://mail.google.com/mail/u/?authuser=greg%40worldwidedronesolutions.com#all/1a1cc3a2bf085fc7

Histogram explanations and figures adapted from revision 1 of the original Mavic 3 Pro protocol (2 November 2026). Figures are schematic exposure examples, not screenshots from this aircraft.

Source document — https://docs.google.com/document/d/1d_GG5qFBupaAsk0CAXQpnT9TDWR-IHPLI9mfOhjHfcc/edit

11 November 2026: corrected short/long charts to 1 cm/pixel increments; recalculated heights, footprints, overlap and blur; flagged rows outside 55–120 m; clarified manual exposure and slow video speeds. Geometry and installed controls still require a preflight check.

Open checks: saved 12 MP dimensions, actual capture cadence, video crop, controller/app versions and the operator’s height reference. Quadcopter notebook destination remains unresolved; this adaptation record is saved with the protocol.