DJI Mavic Air 2 - Capture Protocol

Chañaral de Aceituno • Capture protocol and camera reference • 11 November 2026

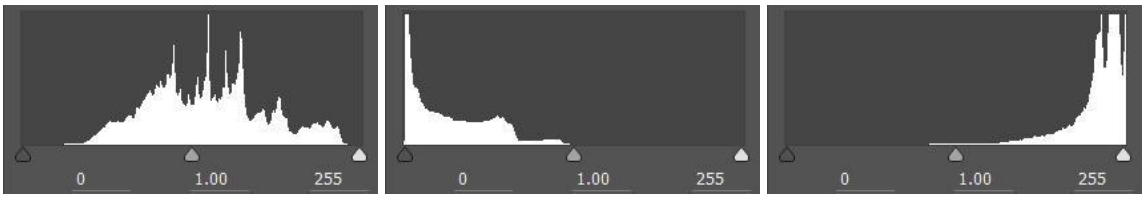
Access notes: DJI Fly camera view; ··· = Settings. Manual v1.6 (2021.05), printed pages; PDF viewer page = printed page + 1.

1 All Protocols

- Use Manual 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 mode → Manual; Auto → EV for exposure compensation (p. 39).
- Start at 1/1000 s; use faster shutter speeds or slower flight when the blur table requires it.
  Manual → shutter → 1/1000 s (p. 39).
- 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.
  Manual → ISO → 100 (p. 39).
- Aperture is fixed at f/2.8.
- Histogram ON
  ··· → Camera → Histogram (p. 39).
- Overexposure warning ON, at the operator's discretion.
  ··· → Camera → Overexposure Warning (p. 39).
- Set the gimbal to nadir, −90°.
  Turn the gimbal dial fully down (p. 28).
- 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 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

- Single wide camera, 1×, 12 MP, 4:3 (4000 × 3000).
  Photo → Timed Shot; ··· → Camera → Photo Size → 4:3 (pp. 39, 48).
- Capture JPEGs.
  Photo → ··· → Camera → Photo Format → JPEG (p. 39).
- Use 12 MP JPEGs at 2-second intervals. Start the sequence and verify files are being saved.
  Shooting Modes → Photo → Timed Shot → 2 s; press shutter (pp. 39, 48).
- Use m/s and Normal mode for surveys; examples ≤12 m/s. Respect lower installed limits and conditions.
  ··· → Control → Aircraft Settings → Metric (p. 39). Flight modes: p. 11.

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. **Fly a steady manual heading in Normal mode.**
   Cruise Control is not documented for ordinary timed photos/video on this model. Fly manually; monitor speed (pp. 22, 33, 40).
5. **Start at 4 m/s. Select a speed giving ≤0.5 pixel estimated blur and ≥75% overlap; slow further as conditions require.**
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 55.5 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
27.8 m	1	40.0 × 30.0 m
55.5 m	2	80.0 × 60.0 m
83.3 m	3	120.0 × 90.0 m
111.1 m	4	160.0 × 120.0 m
138.8 m	5	200.0 × 150.0 m
166.6 m	6	240.0 × 180.0 m
194.4 m	7	280.0 × 210.0 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	55.5 m	86%	2 cm	0.40	0.20	0.10	0.05	0.03
8 m/s	55.5 m	73%	2 cm	0.80	0.40	0.20	0.10	0.05
12 m/s	55.5 m	60%	2 cm	1.20	0.60	0.30	0.15	0.07
4 m/s	83.3 m	91%	3 cm	0.27	0.13	0.07	0.03	0.02
8 m/s	83.3 m	82%	3 cm	0.53	0.27	0.13	0.07	0.03
12 m/s	83.3 m	73%	3 cm	0.80	0.40	0.20	0.10	0.05
4 m/s	111.1 m	93%	4 cm	0.20	0.10	0.05	0.03	0.01
8 m/s	111.1 m	86%	4 cm	0.40	0.20	0.10	0.05	0.03
12 m/s	111.1 m	80%	4 cm	0.60	0.30	0.15	0.07	0.04
4 m/s	138.8 m	94%	5 cm	0.16	0.08	0.04	0.02	0.01
8 m/s	138.8 m	89%	5 cm	0.32	0.16	0.08	0.04	0.02
12 m/s	138.8 m	84%	5 cm	0.48	0.24	0.12	0.06	0.03
4 m/s	166.6 m	95%	6 cm	0.13	0.07	0.03	0.02	0.01
8 m/s	166.6 m	91%	6 cm	0.27	0.13	0.07	0.03	0.02
12 m/s	166.6 m	86%	6 cm	0.40	0.20	0.10	0.05	0.03
4 m/s	194.4 m	96%	7 cm	0.11	0.06	0.03	0.01	0.01
8 m/s	194.4 m	92%	7 cm	0.23	0.11	0.06	0.03	0.01
12 m/s	194.4 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
  Single wide camera; keep zoom at 1× (p. 28).
- MP4 container
  Video → ··· → Camera → Video Format → MP4 (pp. 39, 48).
- H.265
  Video → ··· → Camera → Coding Format → H.265 (p. 39).
- Normal colour; no D-Cinelike or HDR for the baseline.
  Video → ··· → Camera → Color → Normal (p. 39).
- 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 (pp. 38–39, 48).

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. **Fly manually for normal video.**
   Use the control sticks; monitor ground speed (pp. 33, 40).
5. **Start with a hover or slow pass. Use chart 3.2 only as a provisional blur estimate until video crop is checked.**
6. **Use Tripod mode when suitable for slow manual tracking.**
   Controller mode switch → Tripod (pp. 11, 33).
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 Tripod 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 Timed Shot sequence before the first survey: 4000 × 3000 JPEGs, actual capture spacing, sharpness and complete storage. If 2 s is unavailable or unreliable, record the working interval and recalculate overlap.

5 Mavic Air 2 camera reference

One wide camera. Use 12 MP Timed Shot for this protocol. The separate 48 MP single-shot mode is not the documented interval mode. DJI specifications and manual checked 11 November 2026; setup-specific behaviour still needs a brief field check.

Specification	Main wide
Sensor	1/2-inch CMOS
Still resolution	12 MP: 4000 × 3000; 48 MP single: 8000 × 6000
Field of view	84°
Equivalent focal length	24 mm
Aperture	f/2.8
Timed shooting	12 MP: 2/3/5/7/10/15/20/30/60 s

Video — H.265

Camera and resolution	Listed frame rates in 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°	4000 × 3000	1.44065
Wide — UHD 4K	79.2°*	3840 × 2160	1.44065

Calculation: horizontal footprint factor = 2 × tan(84°/2) × 4/5 = 1.44065; still vertical factor = 1.08048. Still GSD = 100 × height × 1.44065 / 4000 cm/pixel. The 79.2° video diagonal and 0.81036 vertical factor assume full-width 16:9 video, not a separately verified DJI video FOV. All calculations assume nadir view and a flat water plane.

6 Interval capture and automation checks

Baseline: manually flown passes with ordinary 12 MP Timed Shot JPEGs. This adaptation is documented guidance, not a demonstrated workflow on Coni's equipment.

Resolve the actual setup

- Coni identifies her aircraft as DJI Mavic Air 2; Ted confirms that model in the 11 November email. Susannah also mentions Air 3/3S aircraft, which need separate protocols.
- Record the actual controller, connected phone if used, and operating system. Do not assume the Mavic 3 Pro controller configuration applies.
- Record the installed DJI Fly version and aircraft/controller firmware versions.
  ··· → About (p. 39).
- Identify the intended mission planner and its actual export format. Confirm a vendor-supported workflow for that exact hardware and software combination.

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.

Timed Shot capture

Ordinary Timed Shot is the preferred baseline: 12 MP with 2, 3, 5, 7, 10, 15, 20, 30 or 60 s intervals. Use JPEG and check actual cadence on the installed setup. Do not assume RAW or JPEG+RAW has the same minimum interval.

The source document's Mavic 3 Pro KMZ replacement and waypoint-export procedures do not establish compatibility with Mavic Air 2. Any third-party mission app needs its own aircraft/controller/phone compatibility check and a non-wildlife validation flight.

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 Mavic Air 2 specifications — https://www.dji.com/mavic-air-2/specs

DJI Mavic Air 2 manual v1.6 — https://dl.djicdn.com/downloads/Mavic_Air_2/20240528UM/Mavic_Air_2_User_Manual_v1.6_EN.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

Adapted from the supplied DJI Mavic Air 2 protocol; the original is unchanged.

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: actual controller/app versions, stable 2 s capture, 4K/60 crop and the operator’s height reference. No verified Quadcopter research-notebook destination is available; this adaptation record is saved with the protocol.