

REMOTE PILOT · UAG

FAA Part 107 Drone License Study Guide

240+ high-yield terms & concepts
for the UAG Remote Pilot
knowledge test: regulations,
airspace, weather, performance,
and safety



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How to Use This Guide

This guide distills the high-yield terms and concepts that appear on the FAA "Unmanned Aircraft General - Small (UAG)" knowledge test - the exam you must pass to earn the FAA Remote Pilot Certificate and operate a small unmanned aircraft (drone) commercially under 14 CFR Part 107. The UAG test covers the areas the FAA publishes for Part 107: applicable regulations (rating privileges, limitations, and flight operations), airspace classification and operating requirements and flight restrictions, aviation weather sources and effects of weather on small UAS performance, small UAS loading and performance, emergency procedures, crew resource management, radio communication procedures, airport operations, and safety and risk management. The exam is 60 scored questions with 120 minutes allowed, and the passing score is 70 percent (42 of 60 correct) per the FAA's published test specifications - always confirm the current format on [faa.gov](https://www.faa.gov), because question counts, time limits, and fees can change. Each concept pairs key facts with a strategy tip and a worked example, so the same page works for a first pass and a last-week review. The guide maps the test the way it actually runs: Part 1 covers the certification process itself (eligibility, the knowledge test, IACRA, and recurrent training); Parts 2-3 cover the Part 107 operating rules, registration, marking, and Remote ID; Parts 4-5 cover airspace classification, LAANC, waivers, and flight restrictions; Parts 6-8 cover weather fundamentals, METAR/TAF decoding, and weather effects on small UAS performance; Part 9 covers loading and performance; Part 10 covers emergency procedures; Part 11 covers crew resource management and radio communications; and Part 12 closes with airport operations and safety/risk management. Honest positioning: this is an independent study aid, NOT approved, endorsed, or produced by the FAA. The official FAA website ([faa.gov](https://www.faa.gov)), 14 CFR Part 107, FAA advisory circulars (AC 107-2), and the FAA Airman Knowledge Testing materials are the ground truth for everything administrative - question counts, fees, scheduling, and rule changes - so confirm them before you register.

Part 1 -- The UAG Knowledge Test & Remote Pilot Certificate (21 Concepts)

The certification path: pass the UAG knowledge test, apply through IACRA, and keep recency with recurrent training every 24 calendar months.

#	Term	Key Facts	Strategy Tip	Example
1	FAA Part 107	14 CFR Part 107 - the FAA rule "Small Unmanned Aircraft Systems" that governs commercial and non-hobby small UAS operations in the U.S.	Every exam answer traces back to a Part 107 section; know the section numbers for key limits.	A pilot operating a drone for real estate photos operates under Part 107, not the recreational exception.
2	Remote Pilot Certificate	FAA airman certificate (Remote Pilot - Small UAS) required to operate under Part 107; earned by passing the UAG test and applying via IACRA.	The certificate is a real FAA airman certificate; carry it during operations.	A real estate photographer holds a Remote Pilot Certificate to fly commercially.
3	UAG Knowledge Test	"Unmanned Aircraft General - Small (UAG)" - the initial aeronautical knowledge test; 60 scored questions, 120 minutes, 70% (42 of 60) passing per FAA published specs; confirm current format on faa.gov .	Budget about 2 minutes per question; skip and return to hard ones.	A candidate answers 60 questions in 100 minutes and passes with 45 correct.
4	Remote Pilot Eligibility	Must be at least 16 years old, able to read, speak, write, and understand English, and in a physical and mental condition to fly safely.	Check the three eligibility bars before paying the test fee.	A 17-year-old who reads and writes English fluently is eligible to test.
5	FAA Tracking Number (FTN)	The unique identifier the FAA uses for airman records; you create it (or are assigned one)		

when you set up your IACRA profile before registering for the knowledge test.

Set up FTN + IACRA first - the testing center will ask for it.	A candidate creates an FTN through IACRA, then schedules the UAG test.
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6	FAA Part 107 Drone License Study Guide	IACRA	Integrated Airman Certification and Rating Application - the FAA's online system used to apply for certificates, including the Remote Pilot Certificate (FAA Form 8710-13).	After passing the test, finish the 8710-13 application in IACRA promptly.	A passing applicant logs into IACRA, completes Form 8710-13, and gets a temporary certificate.
7	Testing centers authorized by the FAA to administer airman knowledge tests; you schedule the UAG test there and must bring a government-issued photo ID.	FAA-Approved Knowledge Testing Center		Bring the exact ID name you used in IACRA/FTN.	A candidate schedules the UAG at a local FAA-approved center and shows a driver's license.
8	Recurrent Training (24 Calendar Months)		To keep recency you must, within the previous 24 calendar months, pass a recurrent knowledge test, complete FAA recurrent training (e.g., the FAASTeam Part 107 recurrent course), or - for Part 61 pilots - meet the flight review requirement.	Put the recurrent date on your calendar; letting it lapse grounds you.	A certificate holder completes the free FAASTeam recurrent course every 2 years.
9	Remote PIC Duties		The remote pilot in command is responsible for the safe operation, must ensure the crew is briefed, and has final authority over the flight.	Expect scenario questions where the remote PIC must say no to an unsafe request.	The remote PIC cancels a flight because winds exceed limits despite client pressure.
10	Certificate in Possession		The remote pilot must have the certificate and ID accessible during operations and present them on request.	Keep a copy (physical or electronic per FAA guidance) in the flight kit.	A police officer asks to see the pilot's Remote Pilot Certificate and ID; the pilot produces both.
11	ALC-451 (Part 61 Pilot Route)		A person holding a pilot certificate under Part 61 (other than student) may complete the free FAASTeam "Part 107 Small UAS Initial (ALC-451)" course instead of taking the initial UAG test.	Part 61 pilots: the online course replaces the initial exam, but recurrent rules still apply.	A private pilot completes ALC-451 online and skips the in-person UAG test.
12	Temporary Certificate & Card		After the 8710-13 application is processed, the pilot can print a temporary certificate; the permanent plastic card arrives by mail.	You can fly with the temporary certificate once issued.	A new remote pilot prints the temporary certificate and starts working the next day.
13	Knowledge Test Report (AKTR)		Passing the UAG test produces an Airman Knowledge Test Report; it is used in the certificate application and is valid 24 calendar months.	Keep the report - you need its ID number for IACRA.	An applicant enters the test report ID into IACRA to complete Form 8710-13.
14	Failing & Retaking the Test		If you fail, you may retake after the testing provider's required wait; the FAA knowledge test fee applies each attempt - confirm the current wait and fee at scheduling.	Do not rush a retake; study the missed areas first.	A candidate fails with 35 correct, studies the airspace section, and passes on the second attempt.
15	FAA Safety Team (FAASTeam)		The FAA's free safety education platform; hosts the ALC-451 initial and recurrent Part 107 courses and other drone safety resources.	Use FAASTeam for free, official recurrent training credit.	A remote pilot logs into faasafety.gov to complete the recurrent course before the 24-month deadline.
16	FAA Form 8710-13		The Airman Certificate and/or Rating Application completed online in IACRA after passing the UAG test; processing produces a temporary certificate.	Do not confuse the knowledge test (UAG) with the application (8710-13) - both steps are required.	A passing applicant submits Form 8710-13 in IACRA and prints the temporary certificate.
17	Temporary vs Permanent Certificate		IACRA issues a printable temporary certificate once the application is accepted; the permanent plastic card arrives by mail from the FAA.	You may exercise privileges with the temporary certificate.	A new pilot flies with the printed temporary certificate while the card ships.
18	FAA Airmen Inquiry		The FAA's public airman-registry lookup; Remote Pilot certificates and ratings are searchable online.	Clients and employers often verify certificates this way.	A client verifies a pilot's Remote Pilot certificate on the FAA Airmen Inquiry before hiring.
19	Knowledge Test Scheduling		The UAG test is scheduled through the FAA's current knowledge-testing contractor at an FAA-approved knowledge testing center; bring your FTN and a government-issued		

20	Test-Day Identification Match	The photo ID name must match your IACRA/FTN
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Book early - seats can fill around deadlines.	A pilot books the UAG test through the testing vendor's portal for the next available slot.
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records exactly at the testing center.

Keep your FTN, IACRA, and ID names consistent.	A pilot whose ID name matches IACRA exactly is
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21	Certificate Portability	The Remote Pilot Certificate is a federal airman certificate, not a state license; it authorizes Part 107 operations nationwide, subject to state and local laws.	A federal certificate still requires local-law compliance.	A pilot with a Florida-issued certificate operates in Texas after checking local drone rules.
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Part 2 -- Part 107 General Operating Rules (21 Concepts)

The day-to-day operating rules: daylight, VLOS, altitude, weather minimums, right of way, and conduct.

#	Term	Key Facts	Strategy Tip	Example
22	Small UAS Definition	A small unmanned aircraft is less than 55 pounds at takeoff, including everything on board or attached, operated without the possibility of direct human intervention from inside or on the aircraft.	"Under 55 lbs at takeoff" is the line between Part 107 and Part 21 aircraft rules.	A 2.2 lb camera drone with a 1 lb payload is a small UAS.
23	Certificate & Registration Required	To operate under Part 107 you must hold a remote pilot certificate (or be directly supervised by one) and the aircraft must be registered.	Both the pilot certificate AND aircraft registration must be valid.	A pilot checks that both their Remote Pilot Certificate and the drone's registration are current before a job.
24	Direct Supervision	A person without a remote pilot certificate may operate a small UAS only under the direct supervision of a certificated remote PIC who can take control immediately.	The supervising PIC must be able to grab the controls - not just watch.	A new hire flies the drone while the certificated PIC stands by with the controller ready.
25	No Careless or Reckless Operation (107.23)	No person may operate a small UAS in a manner that endangers the life or property of another.	This is the catch-all rule; scenarios about risky flight near people implicate it.	A pilot flying low over a crowded beach is operating recklessly under 107.23.
26	Alcohol & Drugs (107.27)	No operation within 8 hours of consuming alcohol, while under the influence, or with a blood alcohol of 0.04 or more; no operation using a drug that impairs judgment.	8 hours and 0.04 BAC are the hard numbers.	A pilot who drank the night before but flew 6 hours later violates the 8-hour rule.
27	Daylight & Civil Twilight (107.29)	Operations may be conducted in daylight; since April 2021, civil twilight is also allowed if the UAS has anti-collision lighting visible for 3 statute miles.	Night ops are legal now, but anti-collision lighting is mandatory.	A pilot flies a real estate job at civil twilight with the drone's anti-collision strobe on.
28	Visual Line of Sight (107.31)	The remote PIC and visual observer must maintain visual line of sight of the small UAS at all times, unaided by anything except corrective lenses.	VLOS must be maintained continuously - binoculars don't count as the primary means.	A pilot keeps the drone within clear unaided sight over an open field.
29	Visual Observer (VO)	A person who helps the remote PIC see and avoid by watching the aircraft; when used, the VO must be briefed and effectively communicate with the PIC.	The VO extends your eyes but must stay in two-way communication.	A second crew member calls out when the drone drifts near a tree line.
30	Operating Limits (107.51)	Maximum 400 feet AGL (or 400 feet above a structure if the flight is within 400 feet of it), maximum groundspeed 100 mph, minimum visibility 3 statute miles, 500 feet below clouds, and 2,000 feet horizontal from clouds.	Memorize the four numbers: 400 ft, 100 mph, 3 SM, 500/2000 ft.	A pilot flying 450 ft over open ground exceeds the 400 ft AGL limit.
31	Right of Way (107.37)	The small UAS must yield the right of way to all other aircraft; no operation may be conducted over persons not directly participating unless permitted by the over-people rules.	When in doubt, give way - the drone always yields.	A pilot descends and holds position to let a Cessna pass overhead.
32	Operations from a Moving Vehicle (107.25)	No operations from a moving aircraft; from a moving land vehicle only if the operation is over a sparsely populated area and does not involve persons or property on the ground.	Moving-vehicle launches are limited to sparsely populated areas.	A farmer uses a moving ATV to launch over empty fields - legal; over a street - not.
33	Multiple Small UAS (107.35)	The FAA allows a remote PIC to operate more than one small UAS at a time if the equipment		

and operation allow maintaining control and VLOS - check current FAA interpretation.

One PIC, multiple drones - only with the right setup and clear sight of all.	A pilot operates two synchronized survey drones while a VO watches the
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24	FAA Part 107 Drone License Study Guide	No Interference with Manned Aircraft (107.19)	Operations must not interfere with manned aircraft, and the PIC must give way; the PIC must also comply with flight restrictions.	See-and-avoid is your responsibility even where the drone has right-of-way obligations.	A pilot spots an approaching helicopter and lands the drone immediately.
35	State & Local Laws	Part 107 is federal; state and local laws (privacy, local ordinances) still apply to your operation.	Federal approval does not override local rules.	A city's drone ordinance limits flights over parks, so the pilot checks local rules too.	
36	Preflight Inspection	Before each flight, inspect the aircraft for damage, secure props and payload, verify battery state, and confirm the home point and firmware.	A short checklist prevents most mechanical failures.	A pilot catches a cracked prop during preflight and swaps it before takeoff.	
37	NOTAM (Notice to Air Missions)	Time-critical notices about airspace, airports, and hazards (TFRs, runway closures, obstructions); pilots must check NOTAMs before flight.	NOTAMs are where TFRs and airport changes are published.	A pilot checks NOTAMs and finds a VIP TFR over the job site - reschedules.	
38	Daylight vs Civil Twilight	Daylight runs from sunrise to sunset; civil twilight is the period before sunrise and after sunset when the sun is within 6 degrees of the horizon. Part 107 allows civil-twilight ops only with an anti-collision light visible for 3 SM.	Day = no light needed; civil twilight = strobe required; night = not allowed unless trained/waived.	A pilot launches 20 minutes before sunrise with the anti-collision strobe on - legal in civil twilight.	
39	Medication & Impairment	No person may operate while using any drug that impairs judgment or alertness - including prescription and over-the-counter medications.	If a label warns against operating machinery, do not fly.	A pilot on a sedating allergy medication scrubs the flight.	
40	Operations Near Emergencies	Stay clear of emergency-response activity (wildfires, accidents, law-enforcement scenes); the FAA often issues TFRs over such events.	Treat active emergency scenes as no-fly zones and check TFRs.	A pilot diverts around a wildfire TFR covering the burn area.	
41	Knowledge of Aircraft & Manual	The remote PIC must know the aircraft's flight characteristics, limitations, and manual before operating.	Read the manufacturer's manual before the first flight.	A pilot reviews the manual's wind limits before flying in breezy conditions.	
42	Manufacturer Limits vs Part 107	Manufacturer limits (wind, temperature, payload, battery) are often stricter than Part 107 - safe operation means flying to the stricter of the two.	When in doubt, apply the tighter limit.	A pilot declines a flight that is legal but exceeds the drone's rated wind.	

Part 3 -- Registration, Marking & Remote ID (21 Concepts)

Aircraft registration, marking the registration number, and the Remote ID rule that took full effect September 16, 2023.

#	Term	Key Facts	Strategy Tip	Example
43	Aircraft Registration (Part 48)	Small UAS must be registered with the FAA before outdoor flight; registration is done online through FAADroneZone under 14 CFR Part 48.	Register each aircraft you fly - registration is per aircraft, not per pilot.	A pilot registers a new drone in FAADroneZone before its first outdoor flight.
44	Registration Fee	\$5 per aircraft, valid for 3 years, paid by credit or debit card.	\$5 is the fixed fee; mark the renewal date.	A pilot pays \$5 to register one drone for 3 years.
45	Registration Number Marking	The registration number must be legibly marked on the aircraft; since September 16, 2023, it may be placed inside a closed battery compartment for small UAS instead of on the exterior.	The battery-compartment option keeps the number safe from wear.	A pilot places the registration label inside the battery compartment of the drone.
46	Remote ID (107.300+)	Remote identification broadcasts the drone's identity and location; compliance was required by September 16, 2023 for most Part 107 operations.	Remote ID is a rule, not an option - fly only compliant aircraft unless in a FRIA.	A pilot checks that the drone broadcasts Remote ID before each flight.
47	Standard Remote ID	The drone broadcasts its ID and location natively (built into the aircraft at manufacture) over Wi-Fi or Bluetooth.	New drones with built-in Remote ID need no extra hardware.	A pilot buys a Remote ID-ready drone and it broadcasts automatically during flight.
48	Broadcast Module	An add-on device attached to a non-compliant drone to make it		

broadcast Remote ID; install per the manufacturer's instructions.

Older drones can be upgraded with a broadcast module.	A pilot attaches an FAA-accepted broadcast
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49	FAA Part 107 Drone License Study Guide	FRIA (FAA-Recognized Identification Area)	A location where drones without Remote ID may fly - typically fields recognized through community-based organizations; FRIAs are listed by the FAA.	If your drone lacks Remote ID, fly only in a FRIA.	A model aviation club's field is recognized as a FRIA, so legacy drones fly there.
50	Remote ID Broadcast Data		The broadcast includes the drone's ID (serial or session), position, altitude, and the control station's location, among other data.	Remote ID exists for safety and security - expect the exam to frame it that way.	A nearby observer uses a Remote ID app to see the drone's position and controller location.
51	FAADroneZone		The FAA's online portal for drone registration, airspace authorizations, waivers, and other Part 107 services.	Bookmark DroneZone - it's the hub for registration and waiver applications.	A pilot logs into FAADroneZone to renew registration and apply for a waiver.
52	Certificate of Aircraft Registration		The registration record/PDF issued when you register; carry proof with you and present it on request.	Keep the registration PDF on your phone or in the flight kit.	A pilot shows the registration PDF when asked by an official at a job site.
53	Registration Renewal		Registration is valid 3 years; renew before it expires. The FAA does not allow late renewal - you must re-register after expiration.	Set a reminder; expired registration = unregistered aircraft.	A pilot's registration lapses and they re-register the drone the same day.
54	Registration vs Pilot Certificate		Registration covers the aircraft; the Remote Pilot Certificate covers the pilot - both are required for Part 107 operations.	Exam questions love mixing these up - keep them separate.	A pilot has a valid certificate but an expired registration - the flight is still illegal.
55	Foreign-Registered Aircraft		A person operating a foreign-registered small UAS in the U.S. under Part 107 must hold a remote pilot certificate and the aircraft must be marked/registered per FAA guidance for foreign operators.	U.S. remote pilots may fly foreign-registered aircraft only under specific conditions.	A U.S. pilot checks FAA foreign-operator guidance before flying a non-U.S.-registered drone.
56	Inspection & Enforcement		FAA or law enforcement may request your remote pilot certificate, ID, and aircraft registration; refusal can trigger enforcement.	Keep all three documents accessible during operations.	An FAA inspector at an airshow asks for certificate, ID, and registration; the pilot produces all three.
57	Flying Outside the U.S.		Part 107 applies within U.S. jurisdiction; foreign countries have their own rules - check the local authority before operating abroad.	FAA certificate does not grant international operating rights.	A U.S. pilot registers with the local aviation authority before a job in Canada.
58	FA Registration Number		Part 48 registration numbers begin with 'FA' followed by digits (for example, FA3AB1234) and must be legibly marked on the aircraft per the FAA's marking rules.	The FA prefix identifies a small UAS registration.	A pilot sees FA3AB1234 on the drone's battery-compartment label.
59	Registration Renewal Timing		Registration is valid 3 years; renew before expiry in FAADroneZone. There is no late-renewal option - expired aircraft must be re-registered.	Set a reminder a month before the expiry date.	A pilot renews on time and avoids operating an unregistered aircraft.
60	Registration Covers Both Uses		Aircraft registration is required whether the drone is flown recreationally or commercially; the same registration applies to both.	One registration per aircraft, not per flight type.	A pilot uses one registered drone for hobby flights and paid shoots.
61	Ownership Transfer		When a registered sUAS is sold, the registration does not transfer - the new owner must register the aircraft in their own name before flying.	Register a used drone immediately after purchase.	A buyer re-registers a used drone in FAADroneZone before its first flight.
62	Enforcement & Penalties		Operating an unregistered drone, without Remote ID where required, or outside authorization can lead to FAA civil penalties.	Registration and Remote ID compliance are cheap insurance.	An operator flying without registration faces FAA enforcement after a complaint.
63	FRIA Purpose		FRIAs (FAA-Recognized Identification Areas) exist so drones WITHOUT Remote ID can fly at recognized sites - typically community-based organization fields; Remote-ID-equipped drones should still broadcast.	FRIAs solve the legacy-aircraft problem, not a way around Remote ID for new drones.	A pilot flies a legacy drone at a club field that is a recognized FRIA.

How the National Airspace System is divided and what each class means for a small UAS.

#	Term	Key Facts	Strategy Tip	Example
64	National Airspace System (NAS)	The network of U.S. airspace, airports, and ATC facilities; classes A through G define who may fly where and under what rules.	Know which classes are controlled vs uncontrolled for drone flights.	A pilot identifies whether the job site sits in Class G or Class E airspace.
65	Class A Airspace	From 18,000 feet MSL to FL600; IFR-only; requires ATC clearance - not relevant to Part 107 operations.	Rule it out immediately for sUAS questions.	A drone flying at 400 ft AGL is far below Class A.
66	Class B Airspace	The busiest airports' airspace: surface to 10,000 feet MSL, shaped like an upside-down wedding cake; airspace authorization (LAANC) is required for sUAS.	Class B = big airports, big shape, strict rules.	A pilot needs LAANC approval to fly within 5 miles of a major hub airport.
67	Class C Airspace	Airspace around medium airports: surface to 4,000 feet AGL, with a 5 nm inner ring and 10 nm outer shelf; authorization required.	Class C = two rings: 5 nm inner, 10 nm outer.	A pilot uses LAANC to fly inside the 5 nm ring of a Class C airport.
68	Class D Airspace	Airspace around airports with operating control towers: surface to about 2,500 feet AGL within about 4 nm; authorization required.	Class D = tower, small cylinder.	A drone flight near a towered regional airport requires prior authorization.
69	Class E Airspace	Controlled airspace not classified A-D: surface areas at many airports, transitions starting at 700 or 1,200 feet AGL, and en route airspace; sUAS need authorization in Class E surface areas.	Class E surface at an airport triggers the same LAANC need as B/C/D.	A pilot checks the sectional and sees a dashed magenta ring (Class E surface) around the field - authorization required.
70	Class G Airspace	Uncontrolled airspace, typically surface to 1,200 feet AGL (varies); NO prior authorization is required for sUAS - but the 400 ft, VLOS, and weather rules still apply.	Class G = uncontrolled = no LAANC needed.	A pilot flies at 300 ft AGL in a rural Class G area with no authorization.
71	VFR Weather Minimums (Manned)	Manned VFR flights have class-specific visibility and cloud-clearance minimums (e.g., Class G day: 1 SM visibility, clear of clouds); Part 107 has its own minimums (3 SM, 500/2000).	Don't confuse manned VFR minimums with Part 107's 3 SM rule.	A question quoting "1 mile visibility, clear of clouds" refers to manned VFR in Class G - not the drone's rule.
72	Prohibited Area	Airspace where flight is permanently prohibited (e.g., Camp David); no drone may enter.	Memorize: prohibited = never, for anyone.	A pilot checks the sectional and reroutes around a prohibited area.
73	Restricted Area	Airspace where flight is restricted, often for military activity; check whether the restriction is active before flying.	"Active" is the key word - restrictions are often time-based.	A pilot checks NOTAMs and finds the restricted area is cold (inactive) today.
74	MOA (Military Operations Area)	Airspace where military training occurs; not prohibited for VFR aircraft or drones, but pilots should avoid it and be alert for military traffic.	Avoid when possible; no prior authorization required.	A pilot sees an MOA on the chart and keeps the drone clear of it.
75	Temporary Flight Restriction (TFR)	A NOTAM-defined area where flight is restricted temporarily for events, VIP movement, or disasters; drones must stay clear.	Always check TFRs before every flight.	A pilot checks the B4UFLY app and sees a TFR over the stadium hosting a game - no flight there.
76	Warning & Alert Areas	Warning areas (offshore military) and alert areas (high volume of pilot training) are not prohibited; be aware and avoid when practical.	They inform, not prohibit - but caution is wise.	A pilot avoids an alert area where flight training is heavy.
77	Sectional Chart Airspace Symbols	Blue solid lines = Class B, magenta solid = Class C, blue dashed = Class D, magenta dashed = Class E surface (plus fading and other notations).	Chart-reading questions are common - learn the four line styles.	A pilot reads a magenta dashed circle around a small airport as Class E surface.
78	MSL vs AGL	MSL = height above mean sea		

level (used for airspace floors/ceilings); AGL = height above ground (used for the Part 107 400 ft limit).

Convert carefully: 400 ft AGL in

A pilot flying over a 5,000 ft

79	Sectional Chart Scale	Sectional charts are drawn at 1:500,000 (roughly 6.86 nautical miles per inch) and cover planning distances for a flight.	Use the chart's scale bar rather than estimating.	A pilot measures a 12 nm route on the chart's scale bar.
80	Latitude & Longitude Grid	Charts are gridded in degrees and minutes of latitude/longitude; one minute of latitude is approximately one nautical mile.	The grid helps you pinpoint a launch site.	A pilot reads the coordinates of a launch field off the chart grid.
81	Magnetic Variation	The angle between true north and magnetic north, printed on sectional charts; runways and headings are expressed in magnetic terms.	Variation matters on course and compass questions.	A chart shows 10 degrees east variation; a 350-degree true course is about 360 degrees magnetic.
82	Airspace Floors & Ceilings	Every airspace layer has a floor (where it begins) and a ceiling (where it ends); Class E transition areas commonly begin at 700 or 1,200 feet AGL.	'Floor' and 'ceiling' language appears in chart and exam questions.	A Class E transition area beginning at 700 feet AGL sits above a Class G surface.
83	Special VFR	A clearance that allows manned VFR flight in controlled airspace below basic VFR weather minimums; an ATC authorization, not a sUAS tool.	Recognize it as a manned-aviation concept a drone pilot will not use.	A question describing 'special VFR' refers to a manned aircraft with ATC clearance.
84	ADS-B	Automatic Dependent Surveillance - Broadcast: aircraft transmit GPS-derived position; much controlled airspace requires ADS-B Out (manned aircraft).	Drones generally do not carry ADS-B; Remote ID is the UAS equivalent.	A pilot understands that manned ADS-B improves traffic awareness but does not replace VLOS.

Part 5 -- Airspace Authorizations & Flight Restrictions (21 Concepts)

How to get permission to fly in controlled airspace, waivers, and the rules for people, vehicles, and night.

#	Term	Key Facts	Strategy Tip	Example
85	LAANC	Low Altitude Authorization and Notification Capability - the FAA system that provides near-real-time automated authorization to fly in controlled airspace (Classes B, C, D, and E surface) via apps.	LAANC = instant approval where the app shows green.	A pilot requests LAANC authorization in an app and receives approval within seconds.
86	UAS Facility Maps	FAA-published grids that show the maximum altitude LAANC will approve in each area of controlled airspace.	The facility map tells you the ceiling LAANC will grant.	The facility map shows 200 ft max near the airport, so the pilot plans 150 ft.
87	Airspace Authorization (107.41)	Prior authorization from the controlling facility (ATC) is required to operate in controlled airspace; LAANC is the automated path, with manual DroneZone applications as the alternative.	No authorization = no controlled-airspace flight, no exceptions.	A pilot without authorization keeps the drone in Class G next to the airport.
88	Manual DroneZone Authorization	When LAANC is unavailable (some airspace), pilots apply for authorization through FAADroneZone, often well in advance (FAA guidance suggests up to 90 days).	Plan ahead for locations outside LAANC coverage.	A pilot files a DroneZone airspace authorization for a remote Class D field.
89	Part 107 Waiver (107.200)	A waiver permits operations that deviate from specific Part 107 rules (e.g., night, over people, VLOS, 400 ft) after the FAA reviews a safety case; applied for via FAADroneZone.	Waivers are rule-specific and FAA-approved - not self-granted.	A film crew applies for and receives a 107.31 (VLOS) waiver for a scripted shoot.
90	Common Waiver Types	The FAA commonly waives night operations (107.29), operations over people (107.110), VLOS (107.31), the 400 ft limit (107.51), and operations from moving vehicles (107.25).	Night and over-people waivers are the two you'll see on the exam.	A pilot's night job is covered by an approved 107.29 waiver with anti-collision lighting.
91	Operations Over People (107.110)	Since April 2021, operations over people are allowed in four categories (1-4) based on risk: no exposed rotating parts,		

kinetic-energy limits, and (for categories 3-4) an FAA-accepted airworthiness declaration or type certificate.

Category 1 (lowest risk) over open-air assemblies; higher categories have more restrictions.	A small, guarded-prop drone flies over a sparsely populated street under Category 2 rules.
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92	Over Moving Vehicles	Operations over moving vehicles are permitted under specific conditions (e.g., Category 1-4 with vehicle consent or inside a closed vehicle) - confirm the exact FAA conditions.	Moving-vehicle overflights need the right category and conditions.	A delivery drone crosses a roadway only where the operator meets the closed-vehicle/consent conditions.
93	Anti-Collision Lighting	For night and civil twilight operations under Part 107, the drone must have anti-collision lighting visible for 3 statute miles.	Night flight is legal - but only with the 3 SM strobe.	A pilot checks the strobe's range before a dusk flight.
94	B4UFLY App	The FAA's free situational-awareness app for drone pilots: shows controlled airspace, TFRs, and advisories based on your location.	Run B4UFLY before every flight as a quick restriction check.	A pilot opens B4UFLY and sees a warning about nearby controlled airspace.
95	Movement Areas at Airports	Part 107 operations in airport movement areas (runways, taxiways) require permission from the airport operator and/or ATC.	Movement area = runway/taxiway = permission needed.	A pilot filming at an airport gets airport operator permission before flying near the ramp.
96	Operations Near Non-Towered Airports	At airports without towers, monitor the CTAF, avoid the traffic pattern, and communicate when practical.	Listen first; stay out of the pattern.	A pilot monitors 122.8 (CTAF) and waits for a lull before launching.
97	TFR & NOTAM Checks	Check NOTAMS and TFRs before every flight; many Part 107 accidents trace to flying into a newly published TFR.	TFRs can pop up with little notice - check the day of flight.	A pilot re-checks NOTAMS the morning of the shoot and finds a new TFR - cancels.
98	Operations at Night - Recency	The 2021 rule allows night ops; pilots must have completed initial or recurrent training that covers night operations (the FAA's Team courses include it).	Night privileges require the updated training on record.	A pilot completes the recurrent course covering night ops before flying at dusk.
99	Operating in the Vicinity of Aircraft	Give way to all aircraft, and never operate in a way that could conflict with manned traffic, including helicopters in low-altitude routes.	Helicopters often fly low and fast near hospitals - be extra alert.	A pilot hears rotor noise and lands immediately to clear the path.
100	FDC NOTAM	A regulatory or airspace NOTAM published by the FAA - temporary flight restrictions and airport procedure changes appear here.	Check FDC NOTAMS the day of the flight for new TFRs.	A pilot finds a TFR in an FDC NOTAM the morning of the shoot.
101	LAANC Approved Altitude	A LAANC approval grants a specific maximum altitude from the UAS Facility Map; exceeding the approved altitude violates the authorization.	Fly at or below the granted ceiling.	LAANC approves 100 feet near an airport; the pilot stays at 90 feet.
102	Waiver Application Content	A waiver application describes the proposed operation, the specific rule to be waived, and the mitigations that make it safe (location, crew, procedures, timing).	A specific, well-reasoned narrative supports approval.	A production company files a waiver describing a closed set, crew roles, and altitude limits.
103	Waiver Validity & Scope	Waivers are specific to the operator, the rule, and the operation; they expire and may carry conditions - operate only within the waiver's terms.	Re-apply before expiry; follow every condition.	A pilot checks the waiver's expiration date before a night shoot.
104	Category 1 Over-People	Category 1 drones weigh under 0.55 pounds, have no exposed rotating parts, and need no FAA-accepted safety features - permitted over open-air assemblies of people.	Category 1 is the lightest tier of the over-people rule.	A tiny, guarded-prop drone flies over a small outdoor gathering under Category 1.
105	Class G Below a Controlled Floor	Operations in Class G below an overlying controlled-airspace floor (for example, below a 700-foot Class E floor) do NOT require airspace authorization.	Know whether your operating altitude is inside the controlled layer.	A pilot at 300 feet AGL in Class G under a 700-foot Class E floor needs no authorization.

Part 6 -- Aviation Weather Fundamentals (21 Concepts)

The weather concepts behind the products: pressure, fronts, visibility, and the hazards that matter to a drone.

#	Term	Key Facts	Strategy Tip	Example
106	Weather Sources for Pilots	Official sources: METARs (current), TAFs (forecast), AIRMETs/SIGMETs (advisories), the Aviation Weather Center (aviationweather.gov), and FSS briefings.	Always brief from official products, not just an app forecast.	A pilot checks METAR/TAF plus AIRMETs on aviationweather.gov before a long shoot.
107	METAR	The routine aviation weather report: station, time (Z), wind, visibility, weather, sky condition, temperature/dewpoint, and altimeter.	Learn the order of elements - questions decode from left to right.	"KJFK 151651Z 18012KT 10SM FEW050 22/12 A2992" is a METAR for JFK.
108	TAF	Terminal Aerodrome Forecast: a forecast for a 5-statute-mile radius around an airport, typically 24-30 hours ahead, issued 4 times daily.	TAFs predict, METARs report - the exam tests both.	A TAF calling for gusty afternoon winds changes a pilot's launch time to morning.
109	AIRMET	An advisory for moderate weather phenomena: IFR conditions/mountain obscuration (SIERRA), turbulence (TANGO), icing (ZULU).	AIRMET = moderate; SIGMET = significant/severe.	An AIRMET TANGO for turbulence prompts a pilot to fly early, before heating builds.
110	SIGMET	A significant weather advisory for severe turbulence, severe icing, thunderstorms, or volcanic ash; more urgent than an AIRMET.	SIGMETs can cover convective activity - avoid those areas entirely.	A SIGMET for a line of thunderstorms grounds the drone for the day.
111	Wind Direction & Speed	METAR winds are from magnetic/true direction (degrees) at a speed in knots; gusts are reported after a G.	"18012KT G20" = from 180 at 12 kt gusting 20.	A pilot sees 24015G28KT and decides the gusts exceed the drone's limit.
112	Visibility	Horizontal distance you can see; Part 107 requires at least 3 statute miles for operations.	3 SM is the drone-specific minimum - not the manned VFR number.	Visibility drops to 2 SM in haze, so the pilot scrubs the flight.
113	Ceiling	The height of the lowest broken (BKN) or overcast (OVC) layer; Part 107 requires 500 feet below clouds.	BKN or OVC = a ceiling; FEW/SCT do not make a ceiling.	A METAR shows OVC008 (ceiling 800 ft AGL), far below a safe drone margin.
114	Temperature & Dewpoint	Close temperature-dewpoint spread means humid air near saturation - fog or low clouds likely.	A 1-2 degree spread at night signals radiation fog.	A pilot sees 10/09 on the METAR at dawn and delays the flight until the fog lifts.
115	Altimeter Setting	Reported in inches of mercury (e.g., A2992) or hectopascals; used to set the aircraft's barometric altimeter to read MSL.	A falling altimeter setting usually means approaching low pressure/weather.	A pilot notes the altimeter dropped 0.10 inHg since the morning briefing.
116	Density Altitude	Pressure altitude corrected for temperature: hot days and high elevations reduce air density, degrading propeller thrust and battery-cooling efficiency.	High density altitude = less lift = worse drone performance.	A pilot flying in Phoenix in July expects noticeably slower climb and shorter battery life.
117	High vs Low Pressure	High pressure generally means fair, stable weather; low pressure means clouds, wind, and precipitation.	Winds circulate clockwise around highs and counterclockwise around lows (northern hemisphere).	A deepening low-pressure system triggers the pilot to postpone the job.
118	Fronts	Boundaries between air masses: cold fronts (steep, gusty, showery), warm fronts (gentle slope, stratiform rain), stationary, and occluded.	Cold fronts bring a sharp wind shift and gusts - bad for drones.	A cold front passage at noon forces a pilot to cancel an afternoon shoot.
119	Thunderstorms	Avoid entirely: turbulence, wind shear, lightning, hail, heavy rain, and microbursts all threaten small UAS.	No drone flight within visible thunderstorm activity - period.	A pilot sees cumulonimbus developing and ends the session 30 minutes early.
120	Fog Types	Radiation fog (clear, calm nights, radiational cooling), advection fog (warm moist air over cool surfaces), and upslope fog; all cut visibility.	Fog = visibility under 1 SM and often a VLOS killer.	A pilot waits for advection fog along the coast to burn off before launching.
121	Air Mass	A large body of air with uniform temperature and humidity; its source region (maritime/continental, tropical/polar) sets its character.	Maritime tropical = warm and humid; continental polar = cold and dry.	A maritime tropical air mass brings warm, humid, unstable conditions.

122	Atmospheric Stability	Stable air resists vertical motion (stratiform clouds, steady precipitation); unstable air rises readily (cumuliform clouds, showers, turbulence).	Unstable air means bumpy, convective weather - bad for drones.	A pilot sees lowering cumulus and recognizes an unstable air mass.
123	Temperature Inversion	Air temperature increases with altitude instead of decreasing; the stable layer traps haze and smoke and often accompanies fog.	Inversions usually mean low visibility near the surface.	A morning inversion keeps haze low until the sun mixes it out.
124	Cloud Types	Cumulus (puffy, vertical), stratus (flat layers), cirrus (high, wispy), and cumulonimbus (the thunderstorm cloud).	Cumulonimbus is the cloud to avoid entirely.	A pilot spots cumulonimbus building and ends the session early.
125	Squall Line	A line of thunderstorms, often along or ahead of a cold front, producing strong gusty winds and severe weather.	Squall lines arrive with little warning - monitor radar.	A pilot cancels when a squall line is forecast to pass mid-afternoon.
126	Sea Breeze	By day, cooler air moves inland from the water (sea breeze); at night the flow reverses (land breeze) - a predictable coastal wind shift.	Plan coastal shoots around the sea-breeze change.	A calm morning shoot turns gusty when the sea breeze arrives around 11 AM.

Part 7 -- Weather Products: METARs, TAFs & Decoding (21 Concepts)

Reading the actual weather reports: element order, codes, and time conventions.

#	Term	Key Facts	Strategy Tip	Example
127	METAR Element Order	Station, time (DDHHMMZ), wind, visibility, weather phenomena, sky condition, temperature/dewpoint, altimeter.	Decode left to right in order - that's how the exam presents it.	A pilot reads "KLAX 152053Z 24012KT 10SM SCT250 19/15 A2990" element by element.
128	Wind Group in METAR	Format DDDSSKT: direction (3 digits true) and speed (2 digits knots); "G" = gust; "VRB" = variable direction; "0000KT" = calm.	The first three digits are direction, next two are speed.	"31015G25KT" = from 310 degrees at 15 kt gusting 25.
129	Visibility Group	Reported in statute miles and fractions: 10SM = 10 statute miles; 1/2SM = half mile; M1/4SM = less than 1/4 SM.	"M" before a value means "less than."	A METAR of 1/2SM fog grounds a Part 107 flight (needs 3 SM).
130	Weather Phenomena Codes	BR = mist, FG = fog, RA = rain, SN = snow, TS = thunderstorm, DZ = drizzle; prefixes - (light) and + (heavy), e.g., -RA, +TSRA.	Intensity prefixes and the "TS" qualifier are exam favorites.	"+TSRA" in a METAR means heavy thunderstorm with rain.
131	Sky Cover Codes	FEW = 1-2 eighths, SCT = 3-4, BKN = 5-7, OVC = 8; followed by height in hundreds of feet (FEW050 = few at 5,000 ft AGL); CB = cumulonimbus.	BKN and OVC create a ceiling.	"SCT020 BKN060" means scattered at 2,000 and broken at 6,000 - ceiling 6,000.
132	Temperature/Dewpoint Group	Reported as temperature/dewpoint in Celsius: "22/12" = 22°C, dewpoint 12°C.	The slash separates temp from dewpoint.	A 22/21 spread warns of fog potential overnight.
133	Altimeter Group	"A2992" = 29.92 inHg; some international reports use "Q1013" (hectopascals).	A2992-style is what U.S. exam questions use.	A pilot reads A3001 and sets the altimeter accordingly.
134	TAF Structure	A TAF lists the airport, issue time, validity period, then forecast groups (wind, visibility, weather, sky) with FM (from), TEMPO (temporary), and BECMG (becoming) change groups.	FM/TEMPO/BECMG tell you when conditions change.	"FM161800Z 27015G25KT" means from the 16th at 1800Z, wind becomes 270 at 15 gusting 25.
135	Zulu Time (UTC)	All aviation weather is reported in Z (Zulu/UTC); local time = Z minus your offset (and adjust for daylight saving).	Convert Z to local before briefing; questions often test the conversion.	1800Z in Eastern time (UTC-4, summer) = 2:00 PM local.
136	TAF Validity & Updates	TAFs cover typically 24-30 hours and are issued every 6 hours (0000, 0600, 1200, 1800 Z).	Use the newest TAF for the forecast period you'll fly.	A pilot re-pulls the TAF after 1200Z for the afternoon update.
137	Aviation Weather Center	aviationweather.gov - the FAA/NWS portal for METARs, TAFs, AIRMETS/SIGMETs, radar, and satellite.	Make it the starting point of every preflight weather briefing.	A pilot checks the AWC radar loop to track an approaching band of showers.

138	PIREP	Pilot Report (UA/OV): real-time in-flight weather observations (turbulence, icing, visibility) - valuable local truth.	PIREPs report what's actually happening aloft.	A PIREP of moderate turbulence at 1,000 ft AGL warns of bumpy conditions for the drone.
139	Winds Aloft Forecast (FB)	Forecasts of wind and temperature at altitudes, shown as 6-digit groups (e.g., 2715+04 = wind from 270 at 15 kt, +4°C).	Light/variable winds show as "9900."	A pilot sees 9900 at 3,000 ft, meaning light and variable - good drone weather.
140	AIRMET Sierra	AIRMET for IFR conditions and/or mountain obscuration.	Sierra = ceilings/visibility (IFR) and mountains.	An AIRMET Sierra for mountain obscuration halts a ridge-top inspection.
141	AIRMET Tango / Zulu	TANGO = turbulence; ZULU = icing (plus freezing levels).	Tango = turbulence, Zulu = ice - easy mnemonics.	A ZULU AIRMET with a freezing level near the surface rules out a winter flight.
142	AUTO in METAR	The 'AUTO' qualifier marks a fully automated station report (no human observer) and may omit some weather phenomena.	AUTO stations can miss events - stay cautious.	A METAR ending in AUTO lacks a remark about nearby rain.
143	RMK (Remarks)	The final METAR/TAF section with extra detail: sea-level pressure, temperature trends, precipitation, and local notes.	Read the remarks for local nuance.	A remark noting fog forming at the field edge alerts the pilot.
144	PROB Groups in TAF	Probability groups, e.g., PROB30 2200 1SM TSRA = a 30 percent chance of thunderstorms at 2200Z.	PROB means possible, not certain - build a backup plan.	A TAF with PROB30 thunderstorms prompts a pilot to plan an earlier launch.
145	Wind Shear Special Report (WS)	Special reports and remarks flag low-level wind shear, often near thunderstorms or fronts.	Surface wind shear is a real drone hazard.	A wind-shear special report at a nearby airport grounds the shoot.
146	TAF Amendment (AMD)	TAFs are amended when conditions diverge from the forecast; an AMD TAF replaces the previous one.	Always use the newest amended TAF.	A pilot re-pulls the TAF after seeing an AMD header.
147	Station Identifiers	METARs and TAFs begin with the 4-letter ICAO identifier (KLAX = Los Angeles); U.S. identifiers start with K.	Learn your local station's identifier for quick briefings.	A pilot briefs using KPHX for Phoenix conditions.

Part 8 -- Weather Effects & Small UAS Performance (21 Concepts)

How weather degrades drone capability: batteries, thrust, wind, and the operational adjustments.

#	Term	Key Facts	Strategy Tip	Example
148	Wind Effect on sUAS	Wind forces the motors to work harder to hold position, draining the battery faster and reducing effective range and flight time.	Fly into the wind first so the return trip is downwind.	A pilot flies the outbound leg upwind and saves battery on the way back.
149	Gusts & Turbulence	Gust spread (e.g., 12 gusting 25) creates control challenges and demands extra power margin; rotor wash and mechanical turbulence form downwind of buildings and trees.	Add a gust buffer to your wind limit before you fly.	A drone rated for 25 kt wind struggles in 18 kt gusts near a building complex.
150	Cold Weather & Batteries	Lithium batteries lose capacity and voltage in cold; flight time shrinks and low-battery warnings arrive early.	Keep batteries warm until launch; reduce flight time in cold.	A pilot warms batteries in an insulated pouch and cuts flight time 25% on a 20°F day.
151	Battery Voltage Sag	High current draw (cold, heavy payload, strong wind) drops voltage quickly, triggering low-voltage RTH sooner than expected.	Treat early RTH as real - land and swap packs.	A battery reads 20% but the drone auto-RTHs early because of sag under load.
152	Precipitation	Rain and snow wet the props and electronics, obscure sensors, and add weight; avoid flying in precipitation.	If it's precipitating at the launch site, don't fly.	A pilot scrubs a shoot when drizzle starts - moisture risks a short circuit.
153	Humidity & Moisture	High humidity causes lens fogging, corrosion, and electrical issues; bring desiccant and keep electronics dry.	Condensation on a cold drone entering a warm car is a real hazard.	A pilot lets the drone warm up in its case before opening it indoors.
154	Density Altitude & Thrust	Hot, high-elevation air is less dense, so props bite less: climb rate, payload, and endurance all drop.	Fly lighter or earlier in the day at high density altitude.	At 8,000 ft density altitude a drone carries less payload and climbs sluggishly.
155	Icing	Prop and airframe ice adds		

weight and destroys lift; fly in visible moisture near or below freezing and you risk icing.

If freezing temps + moisture

156	Microburst & Wind Shear	Thunderstorm downdrafts produce violent outflow winds near the ground - deadly for drones and aircraft alike.	Stay well away from any convective activity.	A storm cell 10 miles away still prompts a pilot to land for the day.
157	Thermal Updrafts	Sun-heated ground creates rising air that can push a hovering drone around and carry it aloft.	Over dark surfaces (asphalt, fields) thermals are strongest at midday.	A hovering drone gains altitude unexpectedly over a hot parking lot.
158	Wind Shear	A sudden change in wind speed/direction with height (near fronts, inversions, or terrain) can overpower a small UAS quickly.	Expect shear near frontal boundaries and coastlines.	A drone climbing through 150 ft AGL hits a shear layer and drifts 30 ft sideways.
159	Terrain & Mechanical Turbulence	Airflow over ridges, canyons, and buildings creates rotors and eddies that buffet small drones.	Keep clearance downwind of obstacles; use a VO in complex terrain.	A pilot keeps the drone 200 ft above a ridgeline to avoid rotor turbulence.
160	Fog & VLOS	Fog and haze cut contrast, making the drone invisible even at short range - a VLOS failure.	If you can't see clearly, you can't fly legally.	A pilot halts when the drone becomes hard to see at 300 ft in haze.
161	Solar Glare	Low sun angle and reflections make the drone hard to track; position the sun behind you and brief the VO.	Fly with the sun at your back when possible.	A pilot repositions to keep the sun out of the eyes of the VO.
162	Preflight Weather Briefing	Review METAR/TAF at departure and destination, AIRMETs/SIGMETs, TFRs, and winds aloft, then make a documented go/no-go decision.	Briefing + go/no-go is a tested scenario pattern.	A pilot's briefing shows gusty afternoon winds, so they move the flight to 8 AM.
163	Prop Guards & Drag	Prop guards protect props and people but add weight and drag, cutting endurance and wind authority.	Add a performance margin when flying with guards.	A pilot removes prop guards on a long mapping flight to save battery.
164	Manufacturer Wind Rating	Every drone has a rated wind resistance (for example, 10 m/s); flying beyond it risks loss of control.	Treat the manufacturer's wind rating as a hard limit.	A pilot checks the manual - 10 m/s max wind, the day shows 12 - no flight.
165	Cold-Weather Payload Planning	Cold reduces battery output and increases power demand; plan shorter flights and lighter payloads in winter.	Winter endurance shrinks even at the same voltage.	A pilot cuts payload weight on a 15-degree-F survey flight.
166	Gust Margin	The gap between the drone's wind limit and the current gust value; keeping a positive margin (for example, 5-10 knots) is a sound personal minimum.	A positive gust margin protects the control authority.	A pilot flying a 25-knot-rated drone declines when gusts reach 22 knots.
167	Humidity & Moisture Risk	Humid air is slightly denser (marginally more thrust) but the moisture risk to electronics and lenses far outweighs any benefit.	Never seek humid air for performance - the risk is not worth it.	A pilot avoids flying in heavy fog despite the denser air.
168	Solar Heating of Electronics	Direct sun can overheat batteries and gimbal electronics; shade the aircraft between flights on hot days.	Let the drone cool before swapping batteries.	A pilot keeps the drone under a canopy between takes on a July shoot.

Part 9 -- Aircraft Loading & Performance (21 Concepts)

Weight, balance, payload, and the performance factors that determine what the drone can do.

#	Term	Key Facts	Strategy Tip	Example
169	Weight Limits	The aircraft plus everything on board must stay under 55 lbs for Part 107 and within the manufacturer's maximum takeoff weight.	Use the manufacturer's MTOW, whichever is lower.	A 3.5 lb drone with a 1 lb payload stays well under both limits.
170	Center of Gravity (CG)	The balance point of the aircraft; an out-of-limits CG causes instability, poor control, and increased crash risk.	Mount payloads per the manual; check CG after adding gear.	Adding a heavy gimbal forward shifts CG, so the pilot moves the battery to rebalance.
171	Payload Management	Cameras, sensors, and cargo change weight, CG, and drag; secure them firmly and verify limits.	Test-fly with the exact payload before the real mission.	A survey pilot runs a 2-minute hover test with the new sensor before the job.
172	MTOW (Maximum Takeoff Weight)	The maximum weight specified by the manufacturer for safe takeoff; never exceed it, even if		

173	Propeller Size & Pitch	Prop diameter and pitch set	MTOW is a hard ceiling from the maker.	A drone's manual says MTOW 2.5 kg; the pilot flies at 2.4 kg.
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thrust and efficiency; use only manufacturer-approved props - wrong or damaged props cause vibration and poor performance.

Inspect props for nicks and

A pilot replaces a chipped prop

174	Battery Capacity (mAh)	Higher milliamp-hours = more stored energy (and more weight); plan flight time with a reserve margin.	Never plan to land at 0% - keep a reserve.	A pilot plans an 18-minute flight on a battery good for 25 minutes.
175	Flight Time Planning	Compute endurance minus reserve, minus the extra draw of wind, cold, and payload.	Cut planned time in cold/windy conditions by a third.	A pilot reduces a 20-minute planned flight to 14 minutes on a windy day.
176	Thrust-to-Weight Ratio	The ratio of total thrust to aircraft weight; high ratio = snappy climb; low ratio (heavy/high DA) = sluggish response.	Heavier loads and hot air shrink your safety margin.	At max payload in summer heat, the drone's climb rate drops noticeably.
177	Hover vs Forward Flight	Hovering burns more power per distance than steady forward flight; long hovers shorten endurance.	Minimize unnecessary hovering on battery-critical missions.	A mapping flight uses continuous passes instead of hovering between shots.
178	Ground Effect	Within about one rotor diameter of the ground, the downwash cushion adds lift, changing takeoff and landing behavior.	Expect the drone to feel "floaty" in ground effect.	A drone briefly bobs when it enters ground effect during landing.
179	Vibration & Balance	Unbalanced props, worn bearings, or loose arms cause vibration that degrades the IMU and footage and stresses the airframe.	A quick hover test reveals vibration before the mission.	A pilot aborts takeoff after feeling abnormal vibration and finds a loose arm screw.
180	IMU & Compass Calibration	Calibrate the IMU/compass away from metal and magnets; a bad compass causes circling or wrong-direction flight.	Recalibrate after travel or firmware updates.	A pilot recalibrates the compass after setting up next to a steel building.
181	GPS & GNSS	GPS lock and satellite count affect position hold and RTH; WAAS improves accuracy; loss of GPS may drop the drone into attitude (ATTI) mode.	Wait for a solid GPS lock before takeoff.	A pilot sees 14 satellites and a green GPS indicator before launching.
182	Firmware & System Updates	Keep aircraft, controller, and battery firmware current; updates fix bugs and change behavior - fly a test hover after major updates.	Never update firmware right before a critical job.	A pilot updates firmware at home and test-hovers before the paid shoot.
183	Preflight Performance Check	Verify battery charge, prop condition, payload secure, sensor cleanliness, and control response before every takeoff.	Checklist discipline prevents most performance surprises.	A pilot catches a smudged lens during the preflight and cleans it before filming.
184	Performance Margins	Always fly with margin: battery reserve, wind headroom, altitude clearance, and control authority.	Operating at the edge is where accidents happen.	A pilot aborts a shot that would need 95% of battery to complete.
185	Battery Charge Temperature	Charging cold batteries damages them; charge at room temperature and warm packs before flight.	Never charge a pack straight from the cold.	A pilot lets batteries warm to room temperature before charging.
186	Prop Balance & Track	Imbalanced props cause vibration, stress motors, and blur footage; replace or rebalance as needed.	Vibration you can feel is a red flag.	A pilot replaces a prop that causes a visible wobble in hover.
187	Payload Attachment Points	Use manufacturer-designated mounting points; improvised mounts shift the CG and can fail in flight.	Secure payloads with redundant retention.	A pilot uses the factory mount plus a safety tether for the camera.
188	Endurance vs Range	Endurance is time aloft (hover/loiter); range is distance achievable - both shrink with wind, payload, and cold.	Plan missions in time, not just distance.	A 30-minute endurance rating drops to 22 minutes with a payload and headwind.
189	Motor & ESC Heat	Sustained high throttle (heavy payload, wind, heat) overheats motors and ESCs; allow cool-down periods.	Heat soak can trigger an ESC thermal shutdown.	After a wind-battled flight, a pilot lets the drone cool before the next pack.

Part 10 -- Emergency Procedures (21 Concepts)

What to do when something goes wrong: link loss, GPS loss, flyaways, and emergencies.

#	Term	Key Facts	Strategy Tip	Example
190	Flyaway	Loss of control where the drone flies away on its own; use RTH or a kill/land function, track the last known position, and report as needed.	Preprogram RTH and know the failsafe behavior before takeoff.	A drone drifts away in strong wind; the pilot hits RTH and it returns.
191	Lost Link (RC Failure)	Loss of the control link triggers		

the programmed failsafe -
usually RTH or hover - then the
link may be reacquired.

Know what your aircraft does

The controller disconnects; the

192	GPS Loss & Attitude Mode	Losing GPS may switch the drone to attitude mode, which does not hold position - the pilot must stabilize manually.	Practice attitude-mode control in a safe area.	A drone drifts downwind after GPS drop; the pilot hand-flies it back.
193	Low-Battery RTH	At the programmed threshold the drone auto-RTHs; respect it - overriding can cause a dead-stick landing.	Land and swap packs; do not cancel RTH to squeeze in one more shot.	A drone auto-RTHs at 20%; the pilot lands and changes batteries.
194	Return to Home (RTH)	Autonomous return to the recorded home point; verify the home point is set correctly before takeoff and set RTH altitude above obstacles.	A wrong home point = a drone returning to the wrong place.	The pilot confirms home point at the launch pad and sets RTH at 200 ft.
195	Obstacle Avoidance Limits	Sensors miss thin wires, glass, and dark surfaces; never rely on obstacle avoidance alone.	Fly with visual clearance as the primary protection.	A pilot manually clears a power line the sensors did not register.
196	Motor/Prop Failure	A failed motor causes yaw, spin, or loss of control; cut power and descend to a clear area rather than fighting it.	Carry spare props and motors for field repairs.	A motor seizes; the pilot disarms and lets the drone drop into grass.
197	Battery Fire & Overheating	Swollen, hot, or smoking batteries are a fire hazard: land immediately, move the battery to a fire-safe area, and use sand or a LiPo bag.	Never charge unattended or fly a swollen pack.	A pilot lands after feeling a hot pack and places it in a fireproof bag.
198	Bird & Wildlife Strike	Birds attack drones (especially near nests); climb, hold, or land, and avoid nesting areas.	Fly early or late to reduce bird conflicts in spring.	A hawk dives at the drone; the pilot climbs and exits the area.
199	Emergency Landing Site Selection	Pick an open, unpopulated area; consider wind direction and obstacles; a controlled landing beats a crash.	Scan for a safe landing zone before every flight.	A pilot lands a failing drone in an empty soccer field instead of the parking lot.
200	Loss of VLOS	If you lose sight of the drone, climb to regain visual, or use the VO; if unrecoverable, RTH or land.	The VO's job is exactly this - spotting a drone you lost.	A drone passes behind a ridge; the VO tracks it until the PIC regains sight.
201	Communications Failure	If operating under a waiver with ATC coordination and comms fail, execute the pre-briefed contingency - typically land clear of the active area.	Brief the comms-failure plan before every coordinated flight.	A pilot's radio dies; the drone is landed immediately per the plan.
202	Accident Reporting (107.9)	Report to the FAA within 10 days any accident involving serious injury to a person or substantial damage to property not the aircraft itself.	Know the 10-day / serious-injury / substantial-damage triggers.	A drone hits a car windshield; the pilot files the FAA accident report.
203	Post-Incident Actions	Secure the aircraft, preserve flight logs and video, document the scene, and notify the owner/authorities as required.	Logs often prove what actually happened.	A pilot preserves the SD card and flight log after a hard landing.
204	ASRS / ASRP Reporting	The NASA Aviation Safety Reporting Program and the FAA's ASRP accept voluntary, confidential safety reports; they support learning without punishment for inadvertent errors.	File an ASRS report after a close call - it's free and confidential.	A pilot files an ASRS report after a near-miss with a helicopter.
205	Failsafe Programming	Configure RTH, lost-link behavior, altitudes, and obstacle settings before flight - and test them.	Program and test failsafes at a safe altitude.	A pilot tests the lost-link RTH at 50 feet before the job.
206	Emergency Kill Switch	A hardware or software control that cuts the motors instantly; use it only when a controlled landing is not possible.	Know where the kill control is without looking.	A drone drifts toward a hazard; the pilot kills the motors over a safe open area.
207	Visual Observer Emergency Handoff	The VO can direct the PIC or take over in an emergency if equipped; brief the handoff procedure before flight.	Agree on emergency vocabulary (climb, stop, kill).	A VO shouts 'CLIMB!' and the PIC climbs the drone clear of a cyclist.
208	Wind-Driven Flyaway Prevention	A strong tailwind can push a drone beyond VLOS range even at full throttle; fly into the wind on the outbound leg.	Head out upwind so the return leg is with the wind.	A pilot flies the outbound leg into the wind and returns downwind safely.
209	Signal Interference	Wi-Fi, power lines, and RF sources can interrupt the control link; scout for interference before flight.	Avoid launching near antennas and substations.	A pilot moves 100 meters from a cell tower after a control glitch.
210	Water Ditching	If ditching over water is unavoidable, disarm before impact, recover the aircraft,		

Powering wet electronics can short them.	A pilot recovers a ditched drone and leaves it off until fully dry.
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Working as a crew, making decisions, and communicating around airports.

#	Term	Key Facts	Strategy Tip	Example
211	Crew Resource Management (CRM)	Using all available resources - people, equipment, information - to manage risk and complete the mission safely.	CRM questions reward communication and shared awareness.	A PIC and VO debrief before flight and share traffic calls during it.
212	Remote PIC Authority	The remote pilot in command has final authority and accountability for the operation; the PIC must be able to take control immediately.	The PIC says go/no-go - nobody else.	A client pushes for a risky shot; the PIC declines.
213	Visual Observer (VO) Role	The VO maintains visual contact and reports traffic and hazards; must be briefed and in effective communication with the PIC.	The VO is the PIC's second set of eyes, not a bystander.	A VO calls "traffic left" and the PIC holds position.
214	Crew Briefing	Before flight: review the plan, roles, launch/land areas, contingencies, comms, and abort criteria.	A 2-minute briefing prevents most crew confusion.	A PIC briefs the VO on what to call out and where to stand.
215	Checklists	Written checklists for preflight, launch, landing, and emergencies reduce skipped steps under pressure.	Use the same checklist every time - consistency is the point.	A pilot runs the launch checklist and catches an unlatched battery.
216	Workload Management	Prioritize tasks in order: control the aircraft, navigate, then communicate; avoid task saturation.	When busy, fly first and talk later.	A pilot stops answering the client's questions during a tricky landing.
217	Sterile Cockpit	During critical phases (takeoff, landing, emergencies), limit non-essential conversation and distractions.	The exam frames this as "minimize distractions during critical phases."	A PIC asks the client to hold questions until after touchdown.
218	ADM (Aeronautical Decision-Making)	The systematic process of evaluating and managing risk; the FAA teaches the 3P model: Perceive, Process, Perform.	ADM scenarios: perceive the hazard, process the risk, perform the action.	A pilot perceives gusty wind, processes that it exceeds limits, and performs a go-around/cancel.
219	Hazardous Attitudes	Five attitudes degrade decisions: anti-authority, impulsivity, invulnerability, macho, and resignation - each with a standard antidote.	Match the attitude to its antidote on the exam (e.g., macho -> "taking chances is foolish").	A pilot thinking "it won't happen to me" shows invulnerability; the antidote is "it could happen to me."
220	PAVE Checklist	Preflight risk screen: Pilot, Aircraft, Environment, External pressures.	PAVE covers all four risk corners.	A pilot runs PAVE: tired pilot, payload near limit, gusty environment, deadline pressure - and cancels.
221	IMSAFE	Personal readiness check: Illness, Medication, Stress, Alcohol, Fatigue, Emotion.	IMSAFE is the pilot, not the aircraft.	A pilot on cold medication scrubs the flight - medication can impair judgment.
222	Radio Communication Basics	Listen before transmitting, use standard phraseology, identify who you're calling, and state your position/intentions.	Short, standard calls are safer than chatty ones.	A pilot announces "Traffic, Cessna 123 at midfield downwind" on CTAF.
223	CTAF	Common Traffic Advisory Frequency at non-towered airports; pilots self-announce positions to coordinate.	Monitor CTAF before and during any flight near a non-towered field.	A pilot monitors 122.7 CTAF and waits for the pattern to clear.
224	UNICOM	An airport advisory/company frequency (often 122.8 or 123.0) for fuel, weather, and ground services; not ATC.	UNICOM = airport services, not traffic control.	A pilot calls UNICOM for wind and runway conditions at a rural field.
225	Emergency Frequency 121.5	The VHF guard frequency for distress and urgency in manned aviation; drone pilots coordinating with ATC should be familiar with it.	121.5 is a manned-aviation tool; know it, don't misuse it.	A pilot on a coordinated flight keeps 121.5 monitored as a safety practice.
226	ATIS / AWOS / ASOS	Airport weather broadcasts: ATIS (controller-recorded at towered airports), AWOS and ASOS (automated sensors) - they report wind, altimeter, and visibility.	Get the altimeter and wind from these before coordinating near an airport.	A pilot listens to ASOS for the current altimeter at a nearby field.
227	Readback / Hearback	The pilot reads back instructions and the sender confirms, preventing misunderstood communications.	Read back and confirm in any ATC interaction.	A pilot reads back a hold instruction and receives a 'correct' from ATC.
228	Frequency & Callsign			

Mishearing frequencies or

callsigns causes confusion;
write down assigned
frequencies and use your exact
callsign.

Keep a notepad for

229	Crew Fatigue Management	A tired PIC makes worse decisions; schedule flights in alert windows and take breaks.	Fatigue is a hazard as real as weather.	A pilot reschedules an evening shoot after a long day.
230	Brief-Debrief Cycle	Brief before flight, update during, and debrief after - the cycle keeps the crew aligned and builds lessons for the next mission.	Debriefs improve your next flight's safety.	A crew debriefs after a close call and changes their site-survey process.
231	Standard CTAF Call Format	'Who you are calling, who you are, where you are, what you intend' - the four elements of a traffic call.	Concise standard calls prevent frequency clutter.	A pilot calls 'Traffic, drone 1, 2 miles north at 200 feet, entering the area.'

Part 12 -- Airport Operations, Safety & Risk Management (21 Concepts)

Working around airports, managing risk, and staying current and compliant.

#	Term	Key Facts	Strategy Tip	Example
232	Traffic Pattern	The standard rectangular pattern around an airport: upwind, crosswind, downwind, base, final - usually left-hand unless marked otherwise.	Keep drones out of the pattern entirely.	A pilot waits until the downwind leg is empty before launching near the field.
233	Runway Numbering	Runway numbers equal the magnetic heading rounded to the nearest 10 degrees, dropping the last zero (Runway 27 = 270° magnetic).	Runway 09 is roughly east; Runway 27 is roughly west.	A pilot sees Runway 09/27 and knows the orientation is east/west.
234	Towered vs Non-Towered Airports	Towered airports provide ATC clearances and traffic sequencing; non-towered airports rely on CTAF self-announcements.	Near towered airports you need authorization; near non-towered, monitor CTAF.	A pilot requests LAANC authorization near a towered field and self-announces at a quiet grass strip.
235	Movement Area	Runways, taxiways, and other areas used for aircraft movement; Part 107 operations there require airport operator and/or ATC permission.	Movement area = not for drones without permission.	A pilot gets written permission from the airport manager to film on the ramp.
236	Wake Turbulence	Wingtip vortices from large aircraft persist behind them and can toss a small drone violently.	Stay clear of heavy aircraft flight paths and wake.	A pilot waits several minutes after a jet departs before flying near the threshold.
237	Jet Blast & Prop Wash	Exhaust and propeller airflow from taxiing aircraft can destroy a small drone; keep well clear of active taxiways.	Give taxiing aircraft a wide berth.	A pilot moves the launch site away from the taxi route after a C-130 taxis by.
238	Helicopter Operations	Helicopters fly low and fast, especially near hospitals and along routes; their downwash is severe.	Assume helicopters appear without warning near medical facilities.	A pilot lands the drone immediately when a medevac helicopter crosses the site.
239	FAA Safety Team Courses	The FAA Safety Team offers free training: ALC-451 (initial) and the Part 107 recurrent course (ALC-677).	The recurrent course satisfies the 24-month recency requirement.	A pilot completes ALC-677 and logs the completion certificate.
240	Safety Management (SMS)	A structured approach to safety: identify hazards, assess risk, mitigate, and document - the same idea scaled to drone operations.	Treat each mission as a mini-SMS: hazard ID, risk, mitigation.	A pilot documents a hazard (power lines) and mitigates it with a higher altitude plan.
241	Mission Risk Assessment	Before flight: weather, site survey, people, obstacles, airspace, and payload - then a go/no-go decision.	A written go/no-go form improves decisions.	A pilot's risk matrix shows moderate risk from wind; the pilot adds a wind limit and goes.
242	Site Survey	Walk the launch/land area: obstacles, crowds, property lines, emergency landing zones, and line-of-sight geometry.	Survey first, fly second - every time.	A pilot scouts the field, notes a flagpole and a playground, and adjusts the flight path.
243	Privacy & Consent	Respect privacy and property rights; obtain consent before flying over people or private property where local law requires it.	Being a good neighbor is part of being a professional pilot.	A pilot asks a homeowner before flying over their backyard for a real estate shoot.
244	Certificate Currency & Records	Keep recurrent training current (every 24 months), carry certificate and registration, and retain training/waiver documents.	A log of training dates prevents a surprise lapse.	A pilot logs the recurrent course date and sets a 2-year reminder.
245	The Big-Picture Rules	Weight under 55 lbs, registered		

aircraft, certificated pilot,
VLOS, 400 ft, 3 SM visibility,
100 mph, 500/2000 ft cloud
clearance, yield to all aircraft -
these are the spine of every
Part 107 flight.

When in doubt on a scenario,

246	Wind Sock & Wind Indicators	Wind socks and tees at airports show surface wind direction and speed; the sock streams INTO the wind.	Reading the sock tells you the active runway.	A pilot sees the sock streaming east - the wind is from the west.
247	Runway Safety Area	The cleared area around runways; drones must not operate in airport movement areas (including runways) without permission.	Stay well clear of the entire runway complex.	A pilot keeps the drone 500 feet from the runway edge while filming.
248	Airport Obstacle Hazards	Hangars, antennas, approach lights, and fences create obstacles and turbulence near airports.	Treat airport environments as high-obstacle zones.	A pilot avoids a row of hangars that would block VLOS.
249	Operational Risk Management (ORM)	A structured risk process: identify hazards, assess risk, mitigate, execute, and review - used across aviation.	Apply ORM to every mission, not just big ones.	A pilot applies ORM and adds a wind limit for the day.
250	Safety Culture & Voluntary Reporting	Strong safety cultures encourage reporting errors and near-misses without blame (ASRS/ASRP); learning beats punishment.	File a report - it improves the whole system.	A pilot reports a near-miss to ASRS and adjusts procedures.
251	Personal Minimums	Pilot-set thresholds (wind, battery reserve, time of day) stricter than the regulations; professionals operate within personal minimums.	Set and honor personal minimums before the flight.	A pilot's personal minimum is 30 percent battery reserve - lands at 35 percent.
252	Sensor Health Checks	GPS, compass, IMU, and ESCs report status in the preflight app; sensor-error flags mean fix or replace before flight.	Watch for sensor warnings during preflight.	A preflight app check shows a healthy IMU and GPS before launch.