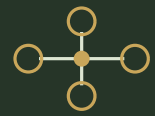


# Truck-Ready Flight Checklist

A field card for safe launch, clean data, and useful notes

01 / Operations



## BEFORE LEAVING THE YARD

- Remote pilot certificate / TRUST proof available
- Drone registration current and marked if required
- Firmware stable; no surprise updates in the field
- Aircraft, controller, cables, landing pad packed
- Batteries charged; one spare beyond mission plan
- microSD cards inserted, empty, and fast enough
- Lens cloth, propeller set, small tool kit, field notebook

## AT THE FIELD BEFORE LAUNCH

- Airspace checked in an FAA-approved app
- Weather acceptable: wind under 15 mph, no precip
- Visibility good; sun/glare manageable
- Launch area clear of people, vehicles, dust, gravel
- Obstacles identified: lines, towers, trees, bins
- Return-to-home altitude set above obstacles
- Mission boundary and altitude verified
- GPS lock acquired and home point set

## DURING FLIGHT

- Maintain visual line of sight
- Yield to any manned aircraft - descend or land
- Watch battery, wind drift, and live image quality
- Abort if shadows, fog, rain, or dust ruin the data
- Do not chase a problem beyond planned limits
- Land with at least 20% battery remaining

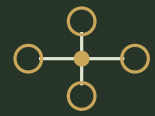
## POST-FLIGHT IN THE TRUCK

- Power down aircraft, then controller
- Inspect props, motors, camera, and gimbal
- Note field, purpose, altitude, battery, image count
- Flag anything needing ground-truthing
- Back up imagery before deleting any card
- Charge batteries to storage level if not flying again

### NO-GO TRIGGERS

Controlled airspace without authorization; precipitation; visibility below safe visual line of sight; crop duster or low aircraft working nearby; uncertain home point; battery, prop, or compass warning; people or vehicles in the launch path.

*Field rule: the checklist protects the flight, but the notes protect the decision. A good flight log turns imagery into usable evidence.*



## FIRST DECISION: WHY ARE YOU FLYING?

Farm management, crop scouting, landlord/insurance documentation, paid services, or any work/business purpose should be treated as Part 107. Pure personal enjoyment is recreational only. When uncertain, use Part 107 and remove ambiguity.

### ONLY PERSONAL ENJOYMENT?

Recreational path: TRUST, CBO safety guidelines, VLOS, give way, 400 ft in Class G, authorization in controlled airspace.

### ANY FARM/BUSINESS PURPOSE?

Part 107 path: Remote Pilot Certificate, drone registration, operational limits, airspace authorization when required.

### SPRAYING OR DISPENSING?

Separate issue: Part 137 may govern dispensing chemicals/ag products. Do not treat spray work as a normal mapping flight.

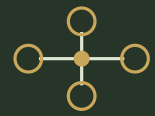
## CARRY / CONFIRM BEFORE LAUNCH

- Remote Pilot Certificate or TRUST proof as applicable
- FAA registration certificate if required
- Drone marked with registration number if required
- Remote ID compliance confirmed for registered aircraft
- LAANC/DroneZone authorization if controlled airspace
- Waiver documentation if operation needs one
- Visual observer briefed if used
- Insurance / emergency contact available

## REGISTRATION SHORTCUT

Part 107 registration is per drone and valid three years. Recreational registration covers the recreational inventory, but drones registered recreationally cannot be flown under Part 107 without the correct registration path.

As of June 18, 2026. Regulations change. Verify at [FAA.gov/uas](https://www.faa.gov/uas), [FAADroneZone](https://www.faa.gov/uaa), and current FAA guidance before flying.



## CORE OPERATING RULES TO KEEP IN FRONT OF YOU

Topic	Field reminder
Altitude	Stay at or below 400 ft AGL unless a specific rule/authorization applies. Most crop mapping works best at 200-300 ft.
VLOS	Keep the drone within visual line of sight. Reposition for large fields instead of stretching visibility.
Aircraft	Yield right of way to all manned aircraft. Land or descend if a crop duster, helicopter, or low aircraft appears.
People/vehicles	Avoid flight over non-participants and moving vehicles unless the operation meets the specific FAA category/rule requirements.
Airspace	Controlled airspace around airports requires authorization. LAANC can provide near-real-time authorization where available.
Night	Part 107 night operations are allowed when rule requirements are met; controlled airspace still needs authorization.
Remote ID	Registered drones generally must comply with Remote ID unless operating under an allowed exception such as a FRIA.
Records	Keep a flight log. It helps compliance, insurance, and management decisions.

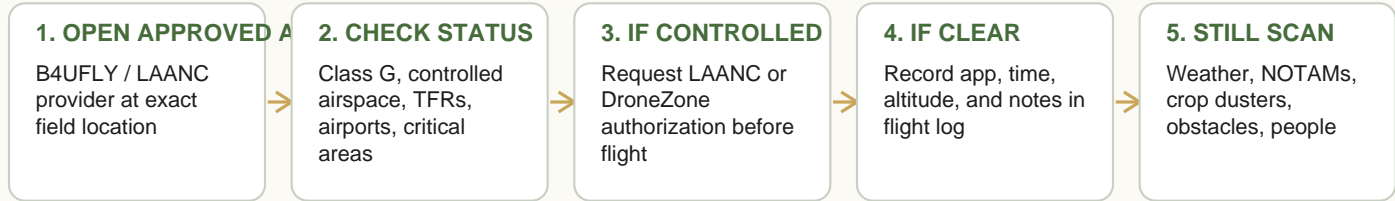
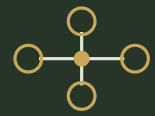
### PLAIN-LANGUAGE CAUTION

This card is an operational aid, not legal advice. Local privacy, pesticide, and landowner issues can still matter even when the airspace rules are satisfied.

# Airspace + LAANC Decision Card

Thirty-second airspace check, with a place to record the result

03 / Airspace



## RECORD THE CHECK

APP/PROVIDER	DATE/TIME CHECKED	MAX ALTITUDE REQUESTED/USED
AIRSPACE RESULT / AUTHORIZATION NUMBER / RESTRICTIONS		
NEARBY HAZARDS: AIRPORTS, HELIPORTS, TOWERS, ROADS, PEOPLE, LIVESTOCK, AIRCRAFT ACTIVITY		

## APPROVED B4UFLY PROVIDERS TO RECOGNIZE

- Airspace Link
- Aloft
- AutoPilot
- Avision
- UASidekick

### REMEMBER

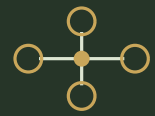
LAANC provides airspace authorization only. It does not replace weather judgment, NOTAM checks, TFR awareness, obstacle planning, or visual line of sight.

Use this page as a print-and-fill card during pre-flight. Staple or scan it with the mission log if the flight supports insurance, landlord, or compliance records.

# Weather + Light Go/No-Go Matrix

Practical thresholds for mapping quality and flight safety

04 / Weather



Condition	Go	Caution	No-go
Wind	0-10 mph; steady	10-15 mph; gusty; watch battery and blur	Over 15 mph, strong gusts, or drift you cannot control
Precipitation	Dry aircraft; no rain	Dew, wet leaves, muddy launch site	Rain, mist, snow, thunder, or wet electronics risk
Visibility	Clear VLOS; 3+ statute miles for Part 107	Haze, glare, light smoke	Fog, dust, smoke, or conditions that hide the drone
Clouds / shadows	Bright overcast is ideal	Sunny: fly near solar noon; lock exposure	Partly cloudy for multispectral; moving cloud shadows
Sun angle	Within 2 hrs of solar noon if sunny	Early/late only for inspection, not mapping	Long shadows across rows or target zones
Battery temp	Moderate temps; batteries warm/cool enough	Hot truck or cold morning - stabilize packs	Battery warnings, swelling, or rapid voltage drop
Crop surface	Canopy visible; objective matches stage	Wet leaves may alter reflectance	Wind-lodged canopy or dust plume masks pattern

## BEST LIGHT RULE

For RGB scouting, consistent light matters more than perfect light. For multispectral work, avoid partly cloudy conditions because cloud shadows can look exactly like crop stress.

*If conditions are marginal, fly a small test strip first and inspect image sharpness, exposure, and shadow patterns before committing batteries to the full field.*

# Mission Planning Worksheet

Use before leaving the yard or before launching at a field

05 / Notebook



FIELD / FARM NAME	DATE + TARGET TIME	PILOT / VISUAL OBSERVER
CROP + GROWTH STAGE	PRIMARY DECISION TO SUPPORT	EQUIPMENT / SENSOR

## MISSION OBJECTIVE

WHAT QUESTION SHOULD THIS FLIGHT ANSWER?

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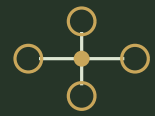
## FLIGHT SETTINGS

Setting	Value	Setting	Value
Altitude AGL		Front overlap	
Side overlap		Speed	
Mission app		Return-to-home altitude	
Battery plan		Expected acres / images	

## HAZARDS AND CONSTRAINTS

- |   |  |
|---|--|
| <input type="checkbox"/> Power lines / towers         | <input type="checkbox"/> Crop dusters / ag aviation    |
| <input type="checkbox"/> Roads and moving vehicles    | <input type="checkbox"/> Tree lines / bins / windmills |
| <input type="checkbox"/> People, livestock, equipment | <input type="checkbox"/> No-fly boundaries             |
| <input type="checkbox"/> Airports / heliports         | <input type="checkbox"/> Landing zone limitations      |



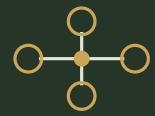


## FLIGHT LOG ENTRY 1

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

## FLIGHT LOG ENTRY 2

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

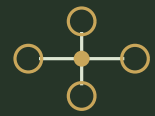


## FLIGHT LOG ENTRY 3

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

## FLIGHT LOG ENTRY 4

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

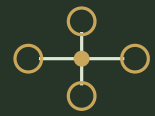


## FLIGHT LOG ENTRY 5

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

## FLIGHT LOG ENTRY 6

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

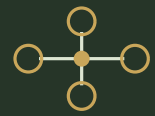


## FLIGHT LOG ENTRY 7

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			

## FLIGHT LOG ENTRY 8

DATE / TIME	FIELD / LOCATION	PILOT / VO	
AIRCRAFT	BATTERY ID	ALTITUDE AGL	MISSION APP
WEATHER / WIND	AIRSPACE RESULT	IMAGE COUNT / ACRES	
PURPOSE AND OBSERVATIONS			
GROUND-TRUTH NEEDED / FOLLOW-UP ACTION			



## AIRCRAFT + CONTROLLER INVENTORY

Item	Value	Item	Value
Drone / serial		Controller / serial	
Remote ID serial		Registration expires	
Prop set installed		Spare props in case	
Firmware version		Last test hover	

## FIELD KIT CHECKLIST

- Drone and controller
- Charged flight batteries
- Controller cable / spare cable
- Charging hub / vehicle charger
- Landing pad
- Lens cloth / sensor brush
- microSD cards + card case
- Tablet / phone sunshade
- Notebook + pencil
- Hi-vis vest or cone for launch area
- Spare propellers / screwdriver
- Portable battery bank

## MICROSD CARD LOG

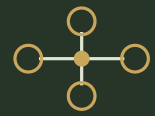
Card ID	Capacity	Formatted date	Copied to backup?	Notes



# Seasonal Flight Calendar - Midwest Row Crop

Timing windows for corn, soybeans, wheat, drainage, and documentation

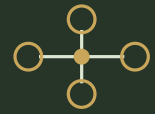
08 / Calendar



Month	Corn	Soybeans	Other opportunities
March-April	-	-	Wheat greenup; pre-season drainage after snowmelt or heavy rain
Late May	V2-V4: stand assessment, emergence, planter performance	V2-V3: early stand and emergence	Post-rain drainage; document replant areas
Early June	V4-V6: routine monitoring; weed scouting	V4-V5: weed scouting before canopy closure	Equipment pattern checks
Late June	V8-V12: nitrogen decision flight if multispectral/NDRE available	R1-R2: canopy closure and baseline health	Wheat heading disease/N assessment
July	VT-R2: pollination stress and disease onset	R3: disease scouting; white mold/frogeye risk	Storm and hail documentation
August	R3-R5: late stress, disease tracking, yield clues	R5-R6: maturity and late disease	Cover crop planning and problem zones
September	R6: final pre-harvest check if needed	R7-R8: harvest timing assessment	Post-harvest drainage flights
Oct-Nov	-	-	Compaction, tile planning, wheat emergence, residue patterns

## HOW MANY FLIGHTS?

Three to four strategic flights per season often deliver most of the value. Add event-driven flights after storms, heavy rain, or when a roadside view raises a question.



## PRINT-AND-CHECK SEASONAL PLAN

Flight window	Target date	Notes / fields
Pre-season drainage / obstacles		
Stand assessment		
Weed scouting		
Nitrogen decision window		
Pollination / disease monitoring		
Storm or damage event		
Pre-harvest / maturity		
Post-harvest / tile / compaction		

### EVENT-DRIVEN FLIGHTS

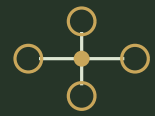
The most valuable flight is often not on the calendar. Fly after a heavy rain to map drainage, after hail/wind to document damage, after a planter issue to define affected rows, or after a neighbor reports something odd.

### FIELDS THAT NEED PRIORITY ATTENTION THIS SEASON

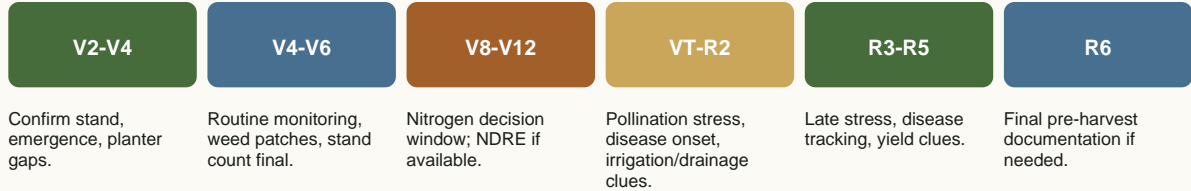
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## Corn



## Soybeans



### BEST PRACTICE

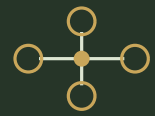
Match the flight to a decision. If no decision can be made from the map, skip the routine flight and save the battery for a weather event or growth stage that matters.

### QUICK TARGET RULES

- Use RGB for stands, weeds, drainage, damage, and visible stress.
- Use multispectral/NDRE for mid-season nitrogen and full-canopy chlorophyll differences.
- Ground-truth any zone before spending money on inputs.
- Compare two flights on the same locked color scale before calling a trend.

# RGB vs. Multispectral Decision Guide

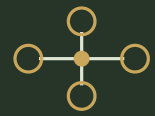
Use the right camera for the decision, not the sales pitch



Application	RGB	Multispectral	Field note
Stand counts / emergence	Yes	Yes	Visible structure; RGB is enough.
Drainage / tile lines	Yes	Yes	Fly after rain, before full dry-down.
Weed patches	Yes	Yes	Most useful before canopy closure.
Equipment streaks / skips	Yes	Yes	Look for row-parallel patterns.
Damage documentation	Yes	Yes	Hail, wind, wildlife, flooding.
Visible stress patterns	Yes	Yes	RGB finds where to scout.
Early stress before visible symptoms	No	Yes	Requires NIR / red-edge response.
True NDVI / NDRE	No	Yes	RGB-only indices are approximations.
Nitrogen assessment / prescriptions	Limited	Yes	NDRE is the key mid-season tool.
Variable-rate prescription creation	No	Yes	Needs calibrated data and agronomic review.

## THE PRACTICAL SPLIT

RGB handles the majority of everyday scouting and documentation. Multispectral earns its keep when early stress, nitrogen status, or calibrated prescriptions change a management decision.



## STICK WITH RGB FOR NOW

- First season of drone use
- Under 200 acres or uniform fields
- No variable-rate equipment
- Primary needs: scouting, stands, drainage, damage documentation

## HIRE MULTISPECTRAL SERVICE

- 200-500 acres and want to test value
- Need 2-3 key flights, not weekly access
- No time to learn calibration/processing
- Want agronomist-supported interpretation

## BUY MULTISPECTRAL

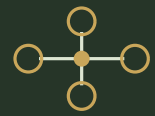
- 500+ variable corn acres
- Have VRT or service provider to act on zones
- Already mastered RGB workflow
- Data will change input rates or service revenue

## START SIMPLE

Do not buy equipment hoping to find a use for it. Buy equipment that solves a problem you have already identified. Prove the concept with simple tools before scaling the investment.

## EXPERIENCE CHECKPOINT BEFORE UPGRADING

- 50+ hours flown safely
- Repeatable naming, backup, and logging process
- Maps have led to at least one useful field action
- You know which sensor limitation is costing you money
- You have a plan to turn maps into prescriptions or service revenue



## FARMER GUIDE TO THE LIGHT BANDS

**Blue**  
450-490 nm

**Green**  
520-570 nm

**Red**  
630-690 nm

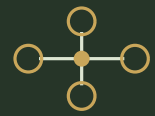
**Red edge**  
700-740 nm

**NIR**  
760-900 nm

Index	Formula	Best for	Limitation
NDVI	$(\text{NIR} - \text{Red}) / (\text{NIR} + \text{Red})$	Early health, stand assessment, general screening	Saturates after canopy closure
NDRE	$(\text{NIR} - \text{Red Edge}) / (\text{NIR} + \text{Red Edge})$	Mid-season nitrogen, full canopy, late stress	Needs red-edge multispectral band
GNDVI	$(\text{NIR} - \text{Green}) / (\text{NIR} + \text{Green})$	Chlorophyll / nitrogen when red-edge unavailable	Less precise than NDRE
SAVI	$[(\text{NIR} - \text{Red}) / (\text{NIR} + \text{Red} + \text{L})] \times (1 + \text{L})$	Early season with visible soil	Little advantage after canopy closure
CI	$(\text{NIR} / \text{Red Edge}) - 1$	Precise chlorophyll / research N work	Less intuitive; less common

### PRACTICAL TWO-INDEX APPROACH

Use NDVI before canopy closure. Use NDRE after canopy closure or when nitrogen/chlorophyll is the question. If you are flying RGB only, skip true vegetation indices and use the imagery for patterns.



## MAP INTERPRETATION MISTAKES TO AVOID

### AUTO-SCALED COLORS

Lock color scales before comparing dates. A green zone on one map may not equal green on another.

### MIXING NDVI AND NDRE

They have different ranges. Know the index before interpreting the number.

### CLOUD SHADOWS

A moving shadow can mimic stress. Check individual photos and flight conditions.

### SINGLE-FLIGHT ACTION

One map is a snapshot. Two maps create a trend. Ground-truth before spending.

### PIXEL OBSESSION

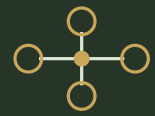
Look for zones, bands, gradients, and repeatable field patterns, not isolated pixels.

### RGB-NDVI CLAIMS

RGB software can show relative vigor, but cannot create true NIR-based NDVI or NDRE.

### FIELD REMINDER

A vegetation index ranks places to investigate. It does not diagnose nitrogen, disease, drainage, compaction, or chemistry by itself.



## SYSTEMATIC MAP-READING WORKFLOW

### 1. START WHOLE-FIELD

What is the dominant pattern? Does it match topography, soil, or operations?

### 2. CHECK THE LEGEND

Index, color scale, date, flight conditions, and whether the scale is locked.

### 3. COMPARE LAYERS

Yield, soil, as-applied, drainage, planting, hybrid/variety, previous imagery.

### 4. RANK ZONES

Which zones are large enough and timely enough to act on?

### 5. GROUND-TRUTH

Walk or sample the top zones before spending money.

### 6. DECIDE + LOG

Action, no action, re-fly, sample, or ask an agronomist.

### GUIDING RULE

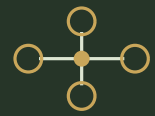
A drone map is not a diagnosis. It is a list of questions, ranked by urgency, with directions to the answers.

### TOP THREE QUESTIONS THIS MAP RAISES

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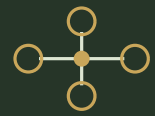


## COMMON PATTERNS AND FIRST QUESTIONS

Pattern	First questions to ask
Row-parallel streaks	Planter, fertilizer, sprayer, or applicator pass? Compare direction to field operations.
Low spots / ponding	Drainage, compaction, tile issue, delayed planting, root damage? Fly after rain.
Tile-line pattern	Tile performance, broken tile, soil drying difference, nutrient movement?
Edge effect	Spray drift, deer/wildlife, road dust, trees/shade, compaction at headland?
Circular / turn zones	Grain cart, manure/compaction, old building site, pivot/traffic pattern?
Gradient across field	Soil type, organic matter, elevation, moisture, variety, application gradient?
Random speckles	Sensor noise, weeds, residue, or single-pixel artifact? Do not overreact.
Cloud-shadow shape	If pattern aligns with photo frames or clouds, suspect illumination before crop stress.

### ESCALATE WHEN

The pattern is large, repeatable on two flights, matches an economically important decision window, and is confirmed by ground truth.



## PURPOSE

Ground-truthing connects the aerial pattern to a field cause. The drone tells you where to look. Your field check tells you why it matters.

## SAMPLE POINT PLAN

Point	Map zone / color	GPS or landmark	Reason for sample
A - healthy reference			
B - moderate concern			
C - severe concern			
D - edge / transition			
E - operator choice			

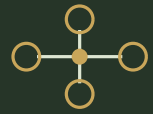
## WHAT TO CARRY

- Phone/camera with geotagging on
- Spade or soil probe
- Tissue sample bags
- Soil sample bags
- Permanent marker
- Notebook / printed map
- Hand lens
- PPE for chemical areas

PRE-SCOUT HYPOTHESIS: WHAT DO YOU EXPECT TO FIND?

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## GROUND-TRUTH STOP 1

POINT ID / ZONE

GPS / LANDMARK

CROP STAGE

PLANT SYMPTOMS

SOIL / MOISTURE

WEEDS / PESTS / DISEASE

PHOTOS / SAMPLES / NOTES

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## GROUND-TRUTH STOP 2

POINT ID / ZONE

GPS / LANDMARK

CROP STAGE

PLANT SYMPTOMS

SOIL / MOISTURE

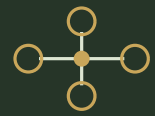
WEEDS / PESTS / DISEASE

PHOTOS / SAMPLES / NOTES

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## DIAGNOSIS AND ACTION LOG

Zone	Likely cause	Evidence	Action	Follow-up date

### AGRONOMIST / APPLICATOR / LANDLORD NOTES

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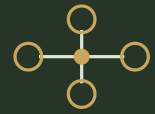
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### CLOSE THE LOOP

After the action, fly or scout again. Mark whether the zone improved, held steady, or worsened. This is how the drone program becomes more valuable each season.



## BASIC FORMULA

Plants per acre = count in 1/1000 acre row length x 1,000. Use drone imagery to identify where to sample, then ground-check representative zones.

Row spacing	1/1000 acre row length	Quick field use
30 in	17 ft 5 in	Common corn row length for a hand count
20 in	26 ft 2 in	Narrow-row corn / specialty
15 in	34 ft 10 in	Soybean drilled/narrow rows
7.5 in	69 ft 8 in	Drilled beans/wheat - consider area frame instead

## STAND SAMPLE LOG

Sample	Zone / map color	Row spacing	Plant count	Notes / missing plants / doubles

## AVERAGE POPULATION AND DECISION NOTES

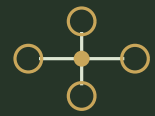
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## DRONE-ASSISTED EMERGENCE CHECKLIST

- Fly early enough to see row gaps clearly
- Use consistent altitude and overlap for comparison
- Mark zones with skips, doubles, crusting, wet holes, or residue issues
- Compare against planting date, hybrid/variety, planter pass, soil type
- Ground-count at healthy, moderate, and poor zones
- Photograph representative row segments
- Document replant boundaries if needed
- Do not make replant decisions from imagery alone

## REPLANT / REPAIR PROMPTS

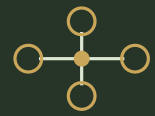
- Is the poor stand contiguous enough to replant or repair?
- Is the remaining stand uniform or patchy?
- Is the calendar still favorable for the crop and hybrid maturity?
- Is the cause fixed, or would replanting repeat the problem?
- What acres are affected, and can the boundary be exported or flagged?

### DECISION / AGRONOMIST RECOMMENDATION / FOLLOW-UP FLIGHT

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## CRITICAL WINDOW

Corn nitrogen demand accelerates from about V8 through VT. Use V6-V12 flights to find zones early enough for side-dress decisions. After R2, focus shifts away from meaningful N intervention.

## NDRE ZONE STARTER TABLE - CALIBRATE LOCALLY

Zone	Approx. NDRE	Map color	Interpretation	Starter adjustment
High vigor	Above 0.45	Dark green	Adequate chlorophyll / likely N-sufficient	Reduce 10-20 lb N/ac from base if agronomically justified
Medium vigor	0.35-0.45	Yellow / light green	Near expected range	Hold base rate or modest change
Low vigor	Below 0.35	Orange / red	Below-adequate chlorophyll; N response possible	Increase 20-40 lb N/ac after ground-truth

## BEFORE CHANGING RATE

- Confirm map uses NDRE or another calibrated multispectral index
- Lock color scale if comparing dates
- Ground-truth low and high zones
- Check drainage, compaction, disease, sulfur, and hybrid/soil differences
- Review with agronomist or nutrient plan constraints
- Keep maximum and minimum rates within realistic equipment limits

### GROUND-TRUTH SUMMARY / LIKELY CAUSE OF LOW ZONES

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## ZONE RATE WORKSHEET

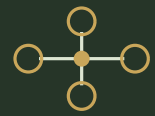
Zone	Acres	Base N	Adjusted N	Reason / notes
High vigor				
Medium vigor				
Low vigor				
Other / excluded				

## ROI / SAVINGS CALCULATOR

Input	Value	Input	Value
Total corn acres		Base N cost per lb	
Average lb N saved or shifted		Potential \$ saved	
Equipment / service cost		Net decision value	

APPLICATION PLAN: WHO, WHEN, EQUIPMENT, FILE FORMAT, FALLBACK PLAN

FOLLOW-UP: RE-FLY / SCOUT DATE AND RESULT



## REALITY CHECK

Drone imagery can reveal pattern, severity, boundary, and urgency. It usually cannot name the disease or insect by itself. Ground-truthing is required before fungicide, insecticide, or rescue decisions.

Drone can help with	Drone cannot prove by itself
Where symptoms are most severe	Exact pathogen or insect identity
Whether a patch is spreading	Economic threshold without field scouting
Whether pattern follows drainage, edges, or rows	Whether fungicide/insecticide will pay
Documentation for insurance/landlord/agronomist	Leaf-level diagnosis from high altitude
Prioritizing where to walk first	Root cause when several stresses look similar

## WHEN TO FLY

- Soybean R2-R3 for disease scouting risk windows
- Corn VT-R2 for disease onset and pollination stress
- After storms or hail to document injury and infection risk
- When roadside color changes appear but the source is unclear
- Before spray decisions to prioritize ground scouting zones
- After treatment to document whether spread slowed

## SCOUT THE TRANSITION

The edge between healthy and stressed crop often tells more than the worst-looking patch. Look for lesions, insects, soil moisture, root health, and nutrient symptoms there.

# Disease + Pest Scouting Card

Use the drone to prioritize scouting, not to replace it

16 / Scouting



## SCOUTING PROTOCOL

Step	Action
1	Review map and mark top 3 zones
2	Visit healthy reference zone first
3	Visit worst zone and transition edge
4	Photograph leaves, stems, roots, canopy, and soil
5	Record disease/insect signs and severity
6	Check weather, hybrid/variety, history, and spray timing
7	Call agronomist if threshold or diagnosis is uncertain
8	Log action and schedule follow-up

### FIELD DIAGNOSIS NOTES

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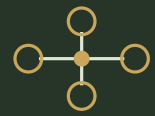
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### TREATMENT DECISION / NO-ACTION REASON / FOLLOW-UP DATE

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## PRESCRIPTION WORKFLOW

### 1. CHOOSE DECISION

N, fungicide, seeding, lime, drainage priority, or scouting only.

### 2. CONFIRM SOURCE MAP

Date, sensor, index, calibration, scale, and flight quality.

### 3. CREATE ZONES

Use agronomic boundaries, not noisy pixel edges.

### 4. ASSIGN RATES

Set min/max rates and agronomist-reviewed logic.

### 5. EXPORT FILE

Match controller format and coordinate system.

### 6. TEST LOAD

Open on actual display before application day.

## BOUNDARY QA

- Field boundary matches the correct field and year
- Headlands handled intentionally
- Waterways, ditches, homes, gardens, and exclusions marked
- Zones are wide enough for equipment response time
- No tiny islands unless agronomically justified
- Prescription uses units the applicator expects

### DO NOT SKIP THE TEST LOAD

A perfect prescription is worthless if the controller cannot read it, the rates are in the wrong units, or the file is assigned to the wrong field.

# Variable-Rate Prescription Handoff Checklist

Bridge map interpretation to an applicator-ready file

17 / VRT



## HANDOFF PACKAGE

- PDF map with legend, date, crop, and index
- Application file in required format
- Field boundary / shapefile if needed
- Rate table with units and min/max
- Notes on no-application zones
- Agronomist or operator approval
- Backup flat-rate plan
- As-applied file requested after job

## APPLICATION DAY NOTES

OPERATOR, EQUIPMENT, CONTROLLER, FILE NAME, ACRES LOADED

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RATE LOGIC / AGRONOMIC CONSTRAINTS / SPECIAL INSTRUCTIONS

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POST-APPLICATION QA: AS-APPLIED FILE, SKIPS, OVERLAPS, WEATHER, FOLLOW-UP FLIGHT

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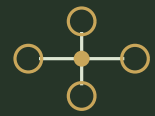
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# Service Provider Bid + Review Sheet

For hiring mapping, multispectral, scouting, or application support

18 / Providers



## USE CASE

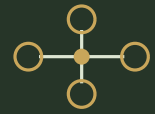
A hybrid approach often works well: own an RGB drone for frequent scouting, and hire multispectral or prescription help for critical windows.

## PROVIDER COMPARISON

Provider	Price / acre	Sensor	Deliverables	Turnaround
Provider A				
Provider B				
Provider C				

## QUESTIONS TO ASK

- Are you Part 107 current?
- Do you carry drone liability insurance?
- What sensor and index will be used?
- How is multispectral data calibrated?
- What file formats are included?
- Who owns the imagery and derived maps?
- How fast are maps delivered?
- Will you ground-truth or only provide maps?
- Can you create VRT-ready files?
- What happens if weather ruins the flight?
- Do you provide as-applied follow-up?
- For spraying: Part 137 and pesticide credentials?



## DELIVERABLES CHECKLIST

- |   |  |
|---|--|
| <input type="checkbox"/> Orthomosaic map                  | <input type="checkbox"/> Prescription file           |
| <input type="checkbox"/> RGB image set                    | <input type="checkbox"/> Ground-truth notes          |
| <input type="checkbox"/> NDVI / NDRE / index maps         | <input type="checkbox"/> Raw data access terms       |
| <input type="checkbox"/> PDF report with legend and notes | <input type="checkbox"/> As-applied comparison       |
| <input type="checkbox"/> Field boundary files             | <input type="checkbox"/> Invoice tied to acres flown |
| <input type="checkbox"/> Zone shapefile                   | <input type="checkbox"/> Date/time/weather record    |

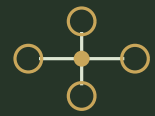
## RED FLAGS

- Promises diagnosis from imagery alone
- Cannot explain index, sensor, or calibration
- No insurance or certificate details
- No sample deliverable to review
- Charges for maps that cannot be used in your equipment
- No plan for weather shadows or failed processing

FINAL SCOPE / AGREED PRICE / DATES / DELIVERABLES

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## OFFLOAD + BACKUP

- Create a folder before copying files
- Copy card to primary computer
- Copy the same files to backup drive/cloud
- Do not format card until backup is verified
- Name folder with date, farm, field, crop, purpose
- Export flight log / app record if available
- Save LAANC or airspace note if applicable
- Keep raw images even if processing fails

## SUGGESTED FOLDER NAMING

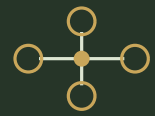
2026-06-15\_Field03\_Corn\_V8\_NDRE/

2026-06-21\_North80\_Soy\_R3\_DiseaseScout/

2026-07-02\_Field07\_Corn\_StormDamage\_RGB/

## MAP QA BEFORE INTERPRETATION

- No missing strips or holes
- No severe blur or rolling shutter
- Lighting consistent across field
- Legend/index/date visible on exported map
- Field boundary correct
- Color scale locked if comparing dates



## DECISION LOG

Date	Map / field	Finding	Decision / action	Owner

WHAT DID THIS FLIGHT CHANGE?

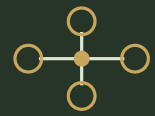
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### CLOSE THE FOLDER LOOP

A flight without a decision note becomes a pile of photos. Write the management question, the answer, and the next action while it is still fresh.



## WEEKS 1-4: SETUP AND SAFE HABITS

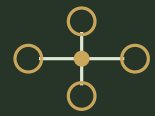
- Study rules; complete Part 107 path if farm/business use
- Register aircraft if required and confirm Remote ID
- Label batteries and set up file folders
- Practice launch, hover, RTH, and emergency landing
- Fly a small non-critical area and review images
- Build repeatable checklist and flight log habit

## WEEKS 5-8: EARLY-SEASON MAPS

- Fly stand/emergence at V2-V6 / V2-V4
- Identify planter, drainage, weed, and stand patterns
- Ground-count representative zones
- Create first useful map report for one field
- Compare map to field history and soil/yield layers
- Document one decision the flight influenced

## WEEKS 9-12: MID-SEASON VALUE WINDOW

- Fly V8-V12 nitrogen window if corn and sensor/service supports it
- Scout low-vigor zones before any input decision
- Use RGB for canopy, stress, weeds, drainage, and damage
- Review with agronomist if rate changes are likely
- Log action/no-action reasoning
- Schedule follow-up flight or field walk



## 12-WEEK PROGRESS TRACKER

Week	Goal	What I did	Result / next step
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

### SEASON-ONE SUCCESS MEASURE

Success is not owning more gear. Success is one repeatable workflow that turns a flight into a better field decision.