

Spray Drones: Regulations, Operation, and Considerations

Al Orgeron

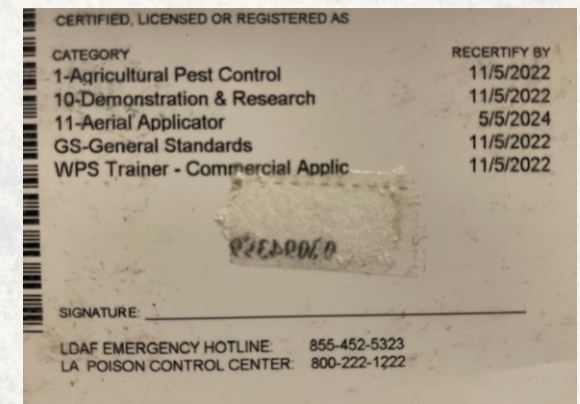


REGULATIONS



Spray Drones Less Than 55 Pounds

- Registration of Drone with FAA
- Operated under 14 CFR Part 107 Small Unmanned Aircraft Systems (less than 55 pounds)
- Part 137 Dispensing Chemicals and Agricultural Products
- Petition for an Exemption
 - §107.36 Carriage of hazardous material
 - several part 137 regulations
- Aerial Applicators License with LDAF (Commercial)



Spray Drones 55 Pounds or Greater

- Registration of Drone with FAA
- Operated under Part 91 General Operating and Flight Rules or Special Airworthiness Certificate
- You may apply for an exemption in accordance with 14 CFR Part 11 (petition)
- 49 U.S.C. § **44807 Weight Exemption:** Special Authority for Certain Unmanned Aircraft Systems
- **Part 137 Dispensing Chemicals and Agricultural Products**
- **Petition for an Exemption**
 - Several [part 61, 91, & 137](#) regulations
- **Aerial Applicators License with LDAF (Commercial)**

DJI Agras
T16, T20, T30 or T40

Hyllo
AG-216, AG-230, AG-272

Leading Edge
PrecisionVision-35X or PrecisionVision40X



CERTIFIED, LICENSED OR REGISTERED AS	
CATEGORY	RECERTIFY BY
1-Agricultural Pest Control	11/5/2022
10-Demonstration & Research	11/5/2022
11-Aerial Applicator	5/5/2024
GS-General Standards	11/5/2022
WPS Trainer - Commercial Applic	11/5/2022
SIGNATURE: _____	
LDAF EMERGENCY HOTLINE:	855-452-5323
LA POISON CONTROL CENTER:	800-222-1222

Information Required for a Petition

- Concept of Operations
- Operations Manual
- Emergency Procedures
- Checklists
- Maintenance Manual
- Training Program
- Flight History (flight hours, cycles, accidents, etc.)
- Safety Risk Analysis

14 CFR 137.19(c)

Regulation

(c) Commercial operator—pilots. The applicant must have available the services of at least one person who holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used. The applicant himself may be the person available.

Why Petitioner is Seeking Relief

In a previous exemption granted to DroneSeed, Exemption No. 17261, the FAA determined that relief from § 137.19(c) was necessary to permit persons holding a remote PIC certificate with small UAS rating to act as PIC for commercial agricultural aircraft operations when utilizing a small UAS to conduct the operations. The FAA found that a commercial or airline transport certificate that § 137.19(c) requires was not a reasonable requirement for the small UAS agricultural operations proposed by DroneSeed.

Equivalent Level of Safety

The basis for the relief was that DroneSeed's remote PICs would comply not only with the requirements of Part 107, subPart C, but also with the additional knowledge and applicable skill requirements in FAR § 137.19(e)(1) and (2)(i), (iv) and (vi). The relief was also based, in Part, on DroneSeed's compliance with the training requirements in its operating documents.

While the proposed operations in this petition for exemption for ROGA involve the operation of UAS weighing 55 pounds or more, the proposed operations are otherwise identical to that previously approved by the FAA in Exemption No. 17261. Consistent with the FAA's prior analysis, compliance with the requirements of Part 107, subpart C, the additional knowledge

Part 107 Exam is No Joke



Louisville Airport is an uncontrolled airport surrounded by a magenta-shaded circle in the sectional charts. What does this magenta circle indicate?

TAF

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KMEM 121720Z 1218/1324 20012KT 5SM HZ BKN030 PROB40 2022 1SM TSRA OVC008CB  
FM2200 33015G20KT P6SM BKN015 OVC025 PROB40 2202 3SM SHRA  
FM0200 35012KT OVC008 PROB40 0205 2SM-RASN BECMG 0608 02008KT BKN012  
BECMG 1310/1312 00000KT 3SM BR SKC TEMPO 1212/1214 1/2SM FG  
FM131600 VRB06KT P6SM SKC=
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KOKC 051130Z 0512/0618 14008KT 5SM BR BKN030 TEMPO 0513/0516 1 1/2SM BR  
FM051600 18010KT P6SM SKC BECMG 0522/0524 20013G20KT 4SM SHRA OVC020  
PROB40 0600/0606 2SM TSRA OVC008CB BECMG 0606/0608 21015KT P6SM SCT040=
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FIGURE 15.—Terminal Aerodrome Forecasts (TAF).

What is the wind speed and direction indicated in the TAF for Memphis International Airport (KMEM) reported at 1720Z?



TFR and NOTAMS

- TFR List
- TFR Map
- Map Airports
- TFR Help
- NOTAM SEARCH
- SUA

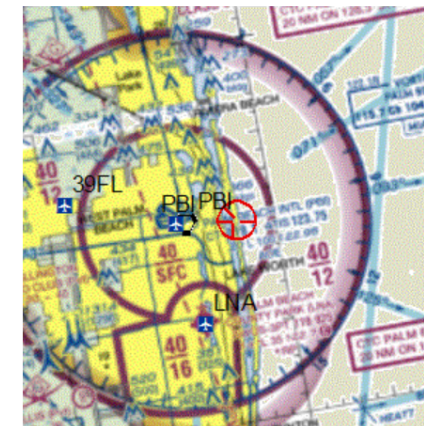
NOTAM

Number : FDC 2/6477 Download shapefiles
Issue Date : November 26, 2022 at 1833 UTC
Location : PALM BEACH, Florida near PALM BEACH VORTAC (PBI)
Beginning Date and Time : November 26, 2022 at 1730 UTC
Ending Date and Time : May 31, 2023 at 0959 UTC
Reason for NOTAM : Temporary flight restrictions for Special Security Reasons
Type : Security
Replaced NOTAM(s) : N/A

Jump To: [Affected Areas](#)
[Operating Restrictions and Requirements](#)
[Other Information](#)

Affected Area(s) Top

Airspace Definition:
 On the PALM BEACH VORTAC (PBI) 097 degree radial
Center: at 2.6 nautical miles. (Latitude: 26°40'37"N, Longitude: 80°02'16"W)
Radius: 1 nautical miles
Altitude: From the surface up to and including 1000 feet AGL



- Click for Sectional
- NOTAM Text

Effective Date(s):

From November 26, 2022 at 1730 UTC (November 26, 2022 at 1330 AST)
 To May 31, 2023 at 0959 UTC (May 31, 2023 at 0559 AST)

Operating Restrictions and Requirements Top

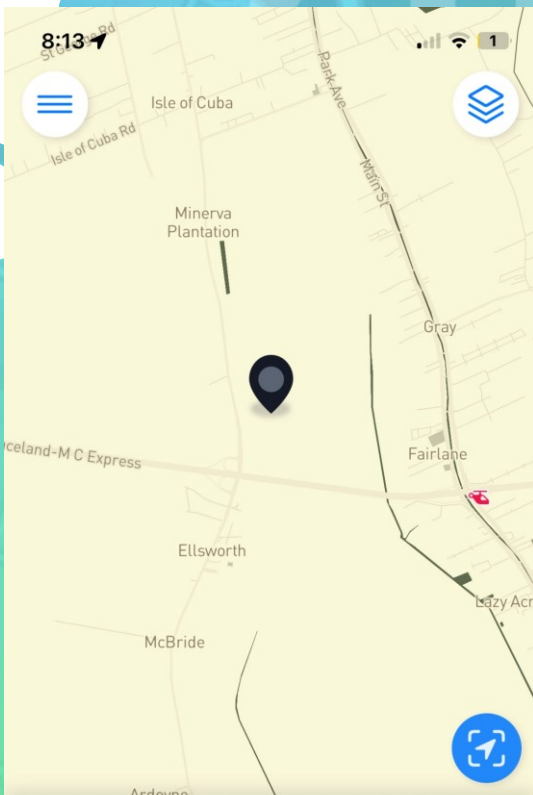
No UAS operations are authorized in the areas covered by this NOTAM (except as described).

EXC AS SPECIFIED BLW:

A. UAS OPS MAY BE AUTH WI THE DEFINED SSI AIRSPACE IF IN COMPLIANCE WITH THE RQMNTS LISTED BLW: 1) UAS OPS IN DCT SUPPORT OF AN ACT NTL DEFENSE, HOMELAND SECURITY, LAW ENFORCEMENT, FIREFIGHTING, SAR, OR DISASTER RESPONSE MISSION; 2) UAS OPS IN SUPPORT OF EVENT OPS; 3) COMMERCIAL UAS OPS WITH A VALID STATEMENT OF WORK; 4) MUST BE IN POSSESSION OF AN APPROVED SPECIAL GOVERNMENTAL INTEREST(SGI) AIRSPACE WAIVER; 5) AND COMPLY WITH ALL OTHER APPLICABLE FEDERAL AVIATION REGULATIONS.

B. UAS OPR IDENTIFIED IN A.1, A.2 OR A.3 ABV MUST APPLY FOR A SGI WAIVER VIA EMAIL AT 9-ATOR-HQ-SOSC@FAA.GOV.

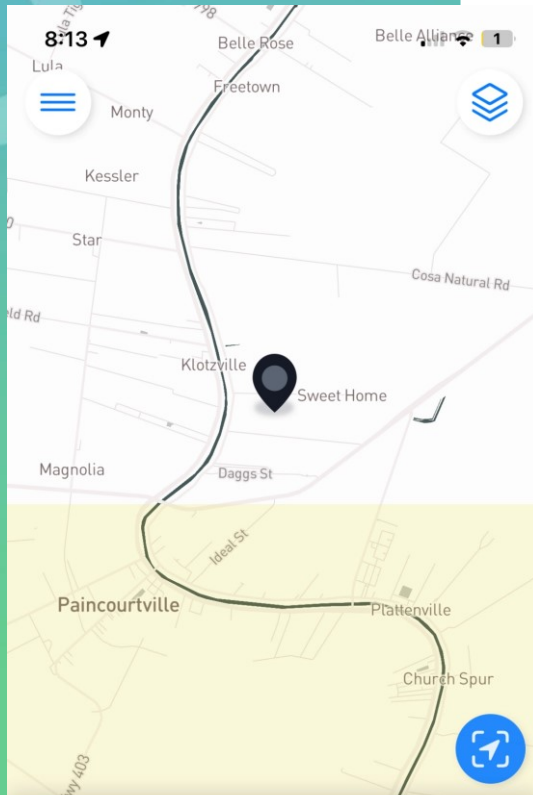
B4UFLY



LAT: 29.689511
LONG: -90.807733

Caution

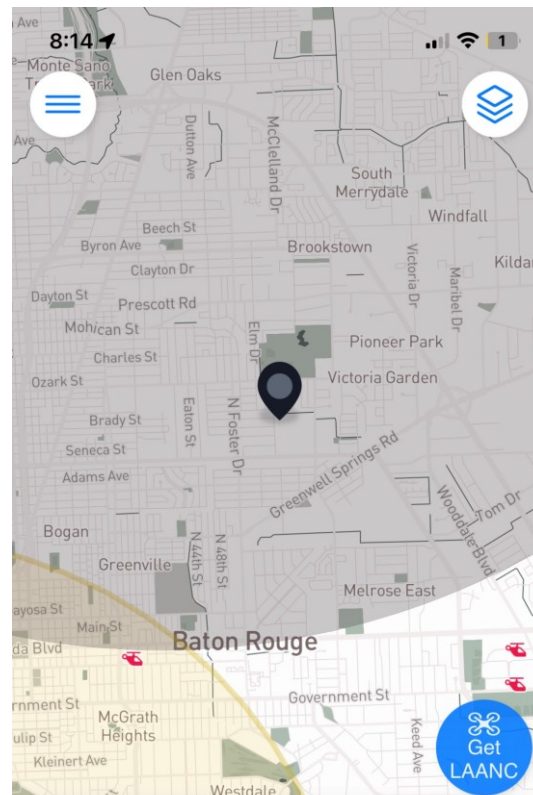
Review active advisories for a compliant operation.



LAT: 30.011525
LONG: -91.039181

Clear for Takeoff

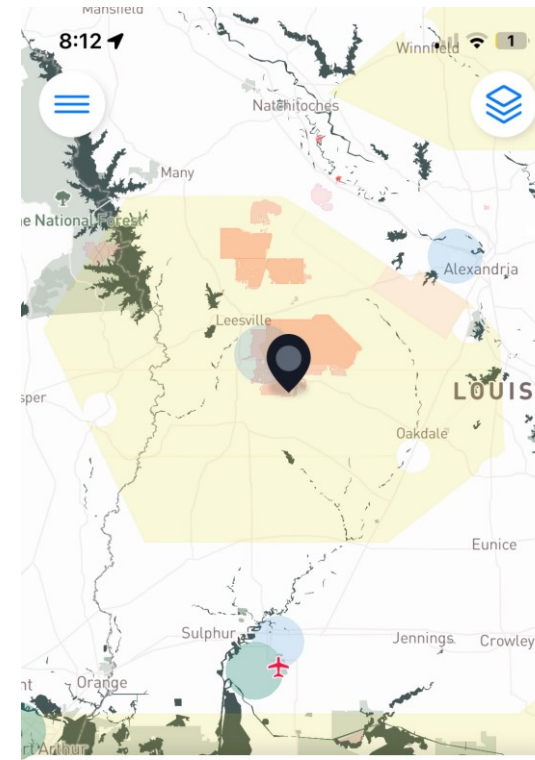
No active advisories. Maintain situational awareness.



LAT: 30.475985
LONG: -91.134779

Controlled Airspace

Airspace authorization required. See details below.



LAT: 30.967420
LONG: -93.110846

Restricted Operations

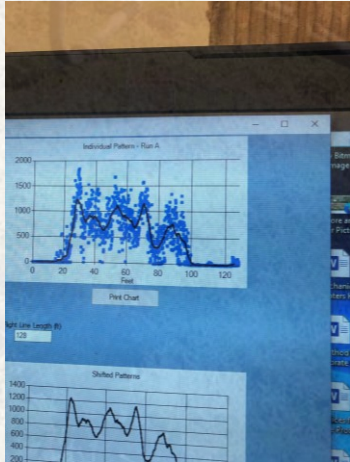
Current advisories restrict flight operations in this area.



OPERATION



Spray Pattern of Aircraft






There is a
Potential
for Spray
Drift






Nozzle Selection



	 	 PSI	DROP SIZE	
			80°	110°
XR8001 XR11001 (100)		15	F	F
		20	F	F
		30	F	F
		40	F	F
		50	F	F
	60	F	VF	
XR8002 XR11002		15	M	M
		20	M	F
		30	F	F
		40	F	F



	 	 PSI	DROP SIZE
AIXR11002 (50)		15	XC
		20	XC
		30	VC
		40	C
		50	C
		60	C
		75	M
	90	M	

Disk Selection

DJI Agras T40



Spray Height Affects Spray Width



DJI Agras T10

Height Above Target

Spray Width

5 feet-----9 feet

10 feet-----12 feet

Aircraft Operation

- Manual vs autonomous operation
- Pay attention to aircraft settings
- Use obstacle avoidance
- Battery Life
- Refilling Aircraft
- Battery Charging
- Settings



Manual vs Autonomous Operation





Field Obstacles

Battery Life/Flight Time

10-12 minutes



Refilling Aircraft



Battery Charging

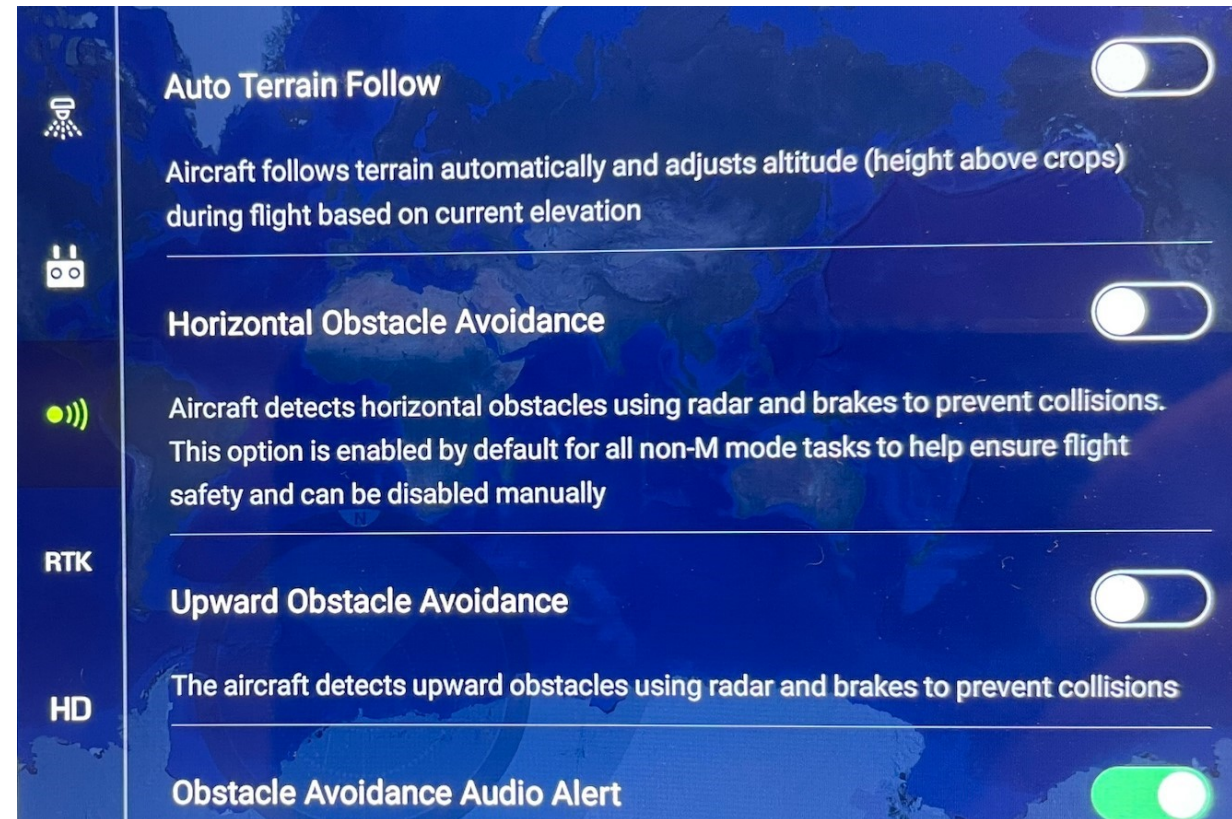
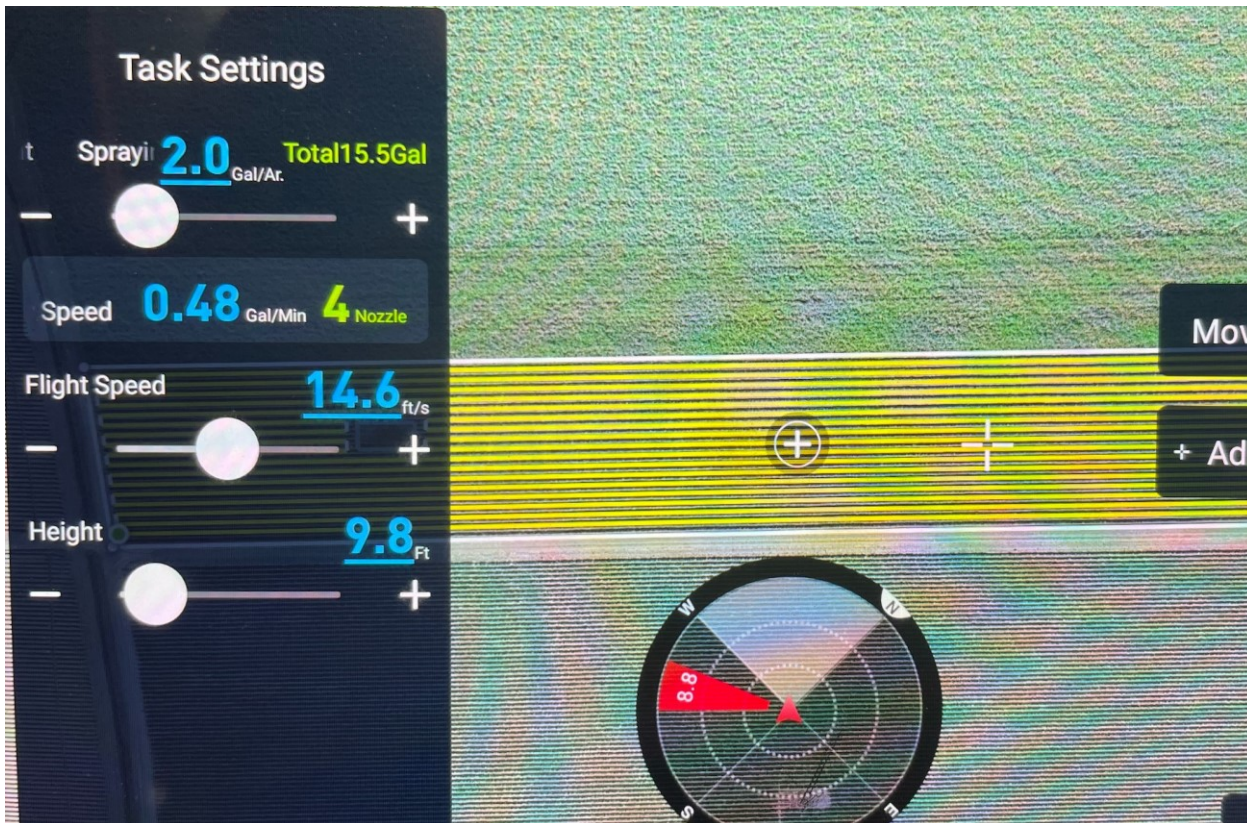


Acreage Sprayed Per Hour

- Length of Spray Run
- Spray Width
- GPA
- Aircraft Flight Speed
- Aircraft
 - T10 ---8 to 10 acres/hour (12 ft swath)
 - T30---20 to 22 acres/hour (18 ft swath)



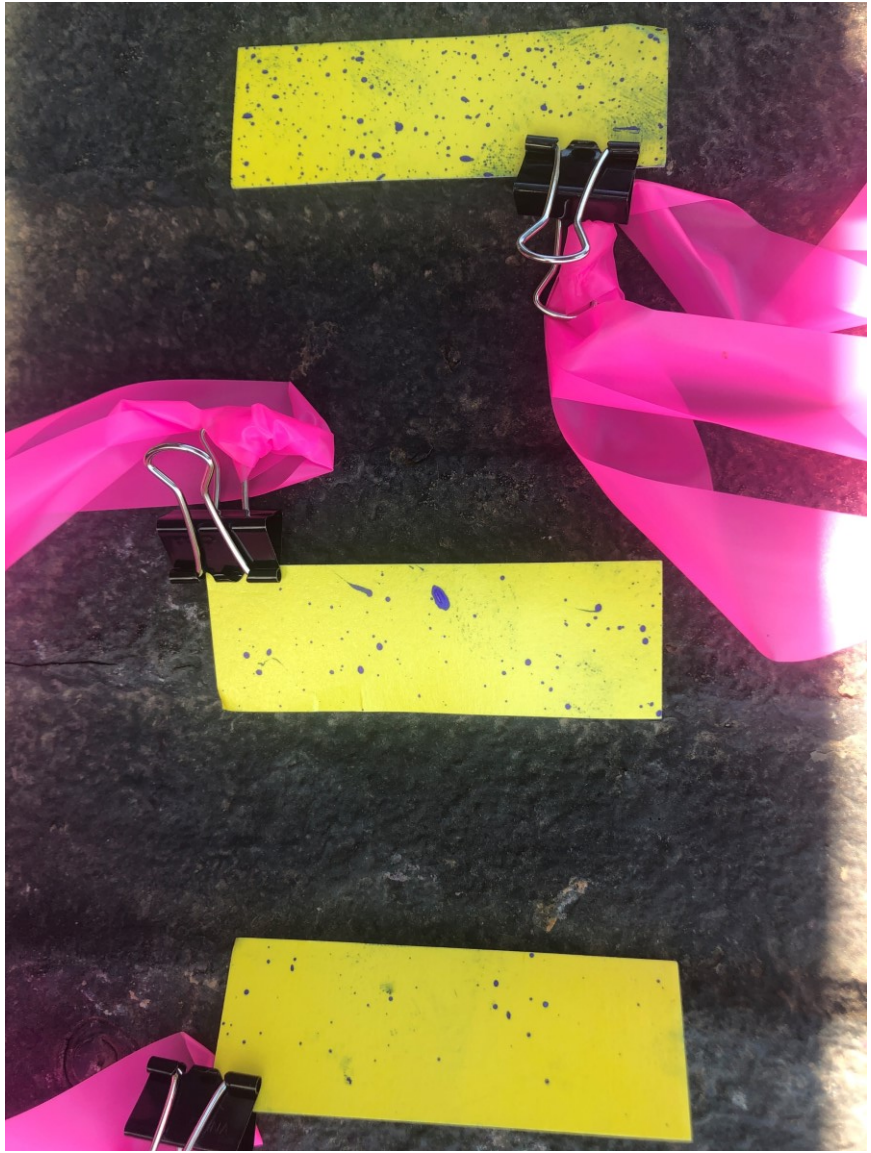
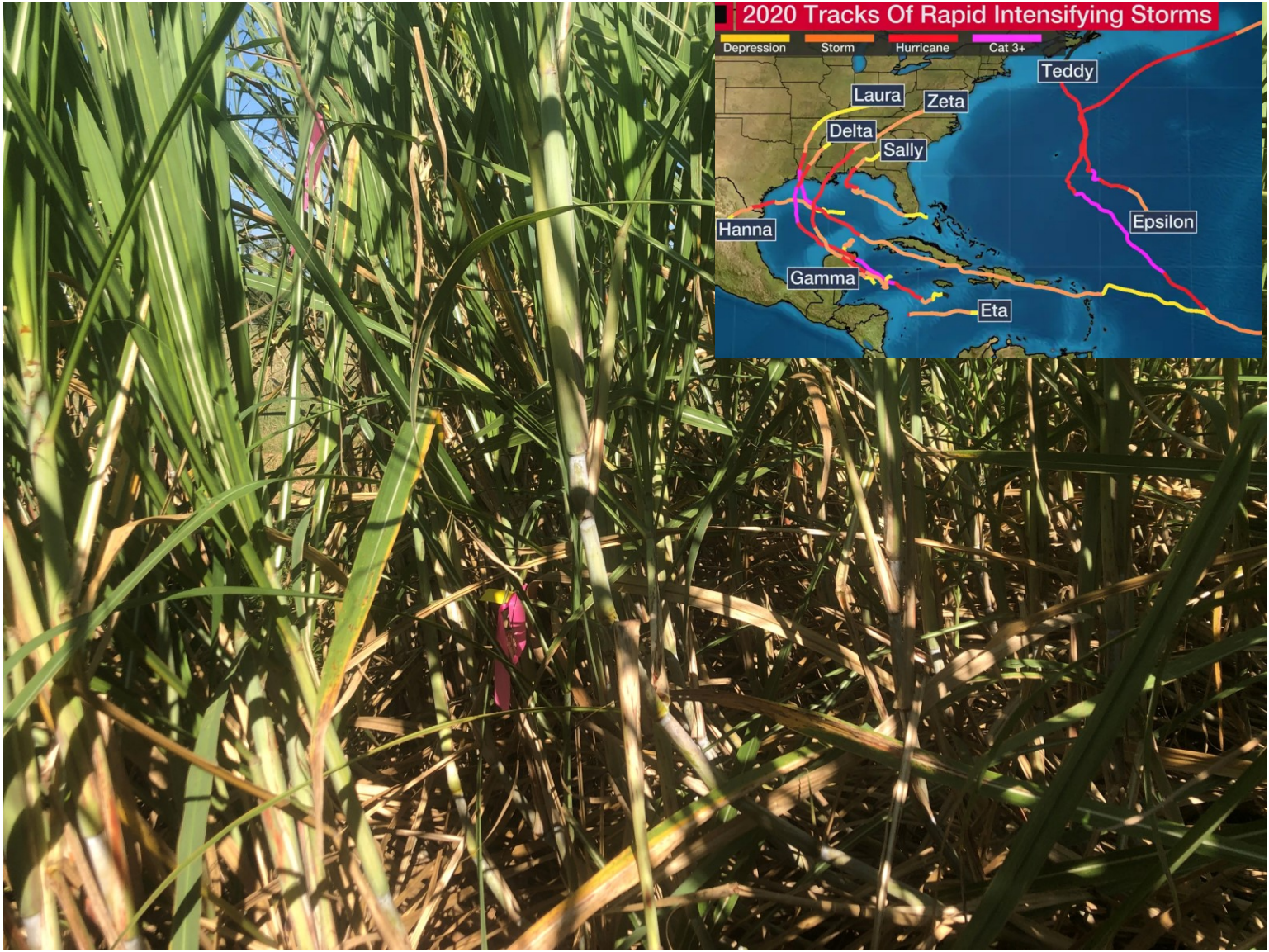
Pay Close Attention to Settings



An Effective Tool

- Chemical Weed Control
 - No agitation
 - WDG
 - WP
- Ripener





2020 Proof of Concept Sugarcane Ripener Study

Treatment	TRS 42 DAT
PMaxII	266
Check	235



Variety: Ho 12-615

Applied: August 15, 2022 New Roads, LA

DJI Agras T10 Spray Drone @ 2 Gallon Per Acre

Plot Size: 100' X 150'

Ripener Treatment	Rate/A	Tons of Cane per Acre	Theoretical Recoverable Sugar per Ton of Cane	Pounds of Sugar per Acre
Roundup PowerMax3	5 oz	39.2	232 a	9094 a
Roundup PowerMax3 + Moddus	2.5 oz + 11 oz	35.6	229 a	8131 a
Untreated Check		42.6	162 b	6911 b

Harvested September 19, 2022, 35 days after treatment



Variety: HoCP 14-885

Applied: August 17, 2023 Cheneyville, LA

DJI Agras T10 Spray Drone @ 2 Gallon Per Acre

Plot Size: 50' X 42'

Treatment	Rate/A	Theoretical Recoverable Sugar per Ton of Cane
Roundup PowerMax3	5 oz	288 a
Roundup PowerMax3 + Moddus	2.5 oz + 11 oz	272 a
Untreated Check		222 b



Harvested September 13, 2023, 27 days after treatment

CONSIDERATIONS Before Purchasing a Spray Drone

- Service
 - Who will fix it when it breaks?
 - How quickly can I get the parts?
- Pesticide Labels
 - Most aerial application are specific as to the nozzle orientation requirements.
- Insurance
 - Does my policy cover accidents if I have a fly away event or injury someone or their property?
 - Does my insurance cover spray drift?



Questions?



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THANKS!

