



LAFD CUPA



UAS PROGRAM OVERVIEW





Presenters



Steven Hamilton

- Los Angeles Fire Department CUPA
- Inspector II
- CUPA Unit FPB
- 19 years with the Los Angeles City Fire Department as a Firefighter/Paramedic and an Inspector II within the CUPA Unit!
- Hazmat Specialist Certified





Presenters



Diana Nguyen

- Los Angeles Fire Department CUPA
- Industrial Hygienist
- CUPA Unit FPB
- 3 years with the Los Angeles City Fire Department as an Industrial Hygienist and previously Student Professional Worker
- Hazmat Specialist Certified





Presenters



Alvin Dong

- Los Angeles Fire Department CUPA
- RMPP Specialist
- CUPA Unit FPB
- 30 years CUPA experience
- Hazmat Specialist Certified



<https://vimeo.com/lafdvideos/medalofvalor>





us bank

ONE WILSON

AOL





Acronyms



- sUAS: small unmanned aircraft system
- UAS: unmanned aircraft system
- UAV: unmanned aerial vehicle
- COA: Certificate of Authorization
- VLOS: visual line-of-sight
- PIC: pilot-in-command
- VO: visual observer
- FAA: Federal Aviation Administration
- ATC: air traffic control
- AGL: above ground level
- IC: Incident Commander

Used interchangeably to describe drones!





Who is in this class?



- Environmental Health
- Fire Department
- Hazmat
- Professional Drone Pilots
- Industry
- Military
- Law Enforcement



Los Angeles City



Los Angeles City – 4,000,000 People!



Port of Los Angeles – *Big Industry!*



LA City Refineries – *3 of them!*





Mission Statement



The members of the Los Angeles Fire Department (LAFD) Unmanned Aircraft Systems Unit (UASU) shall provide aerial observation support for the LAFD and other public safety entities within the City of Los Angeles, and through established mutual aid agreements within the County of Los Angeles. Missions will be accomplished efficiently and safely while respecting the law and the privacy of the citizens we serve.

*Los Angeles Fire Department
Unmanned Aircraft System (UAS) Operations Manual, 2017*



Program Objectives



- Be on the cutting edge.
- Be an innovation leader to the fire service and the hazmat world.
- Improve situational awareness and safety.
- Increase environmental enforcement.
- Save the city \$\$.



What are we talking about today?



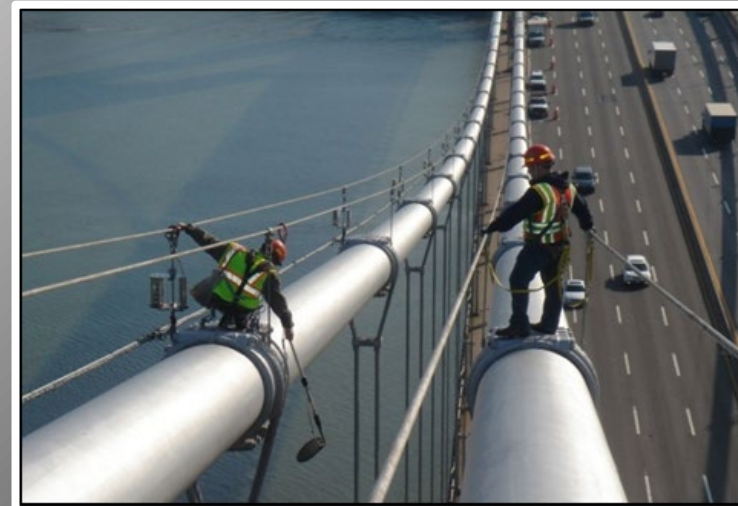
- Small unmanned aircraft systems (sUAS) <55 lbs.
- Below 400 feet AGL
- Capable of transmitting data to the ground
- Controlled by pilot on the ground
- Visual line of sight (VLOS)





Why Use a UAS

- More cost effective than using manned aircraft
- Ideal for missions that are dangerous or unreachable
 - Humans are not put at risk
 - Continuous operations are possible





Unmanned Systems Potential Applications



Border Security	Industrial Logistics	Search & Rescue
Arctic Research	Pollution Monitoring	Volcanic Research
Firefighting	Storm Research	Pipeline Monitoring
Flood Monitoring	HAZMAT Detection	Filmmaking
Crop Dusting	Asset Monitoring	Crowd Control
Mining	Event Security	Aerial News Coverage
Farming	Port Security	Wildlife Monitoring
Aerial Photography	Construction	Forensic Photography
Real Estate	Cargo	Power line Surveying
Communications	Broadcasting	Damage Assessments





Fire Department Applications



Vehicle Accidents

Water Rescues

Urban Search and Rescue

Hazardous Material Accidents

Wildland Fires

Firefighter Tracking / Accountability

Search of Missing Person / Animal

Cliff Rescues

Confined Space Rescues

Structural Collapse

Mass Casualty Incidents



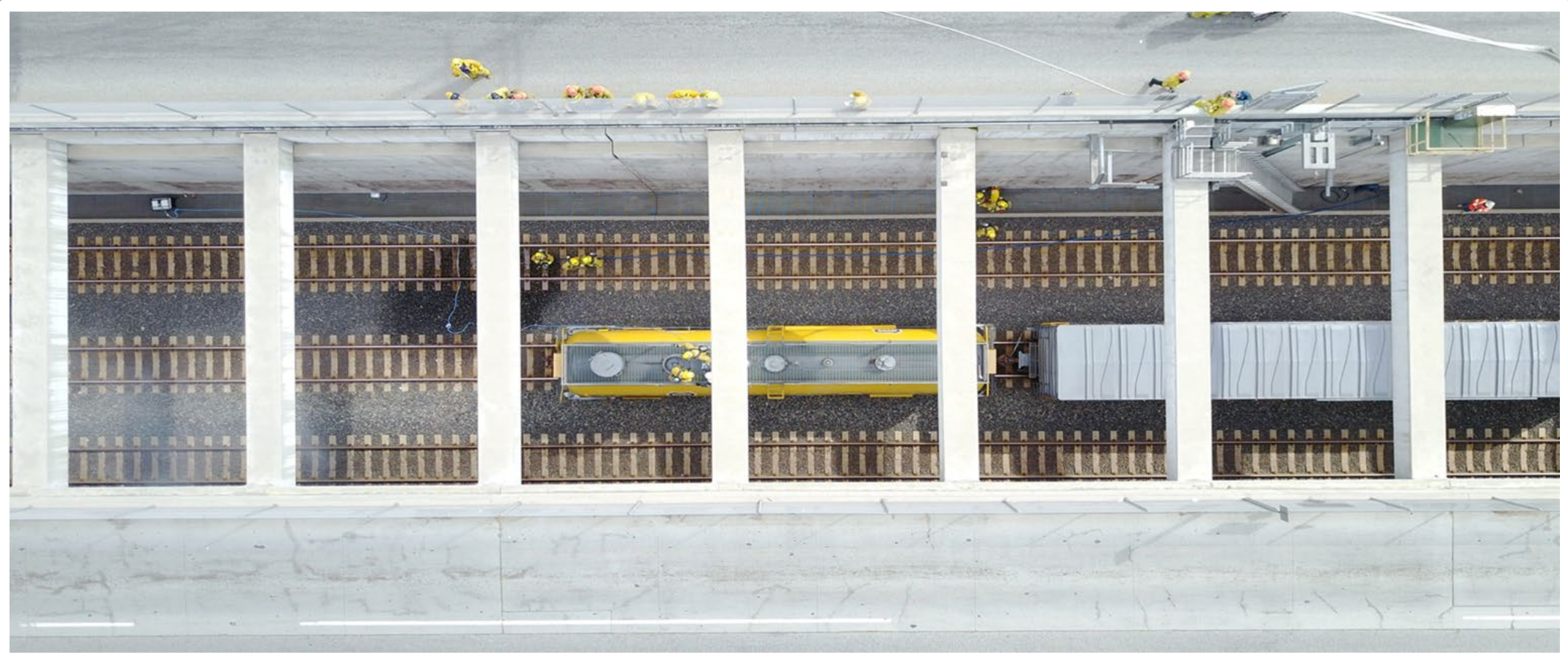


Situational Awareness



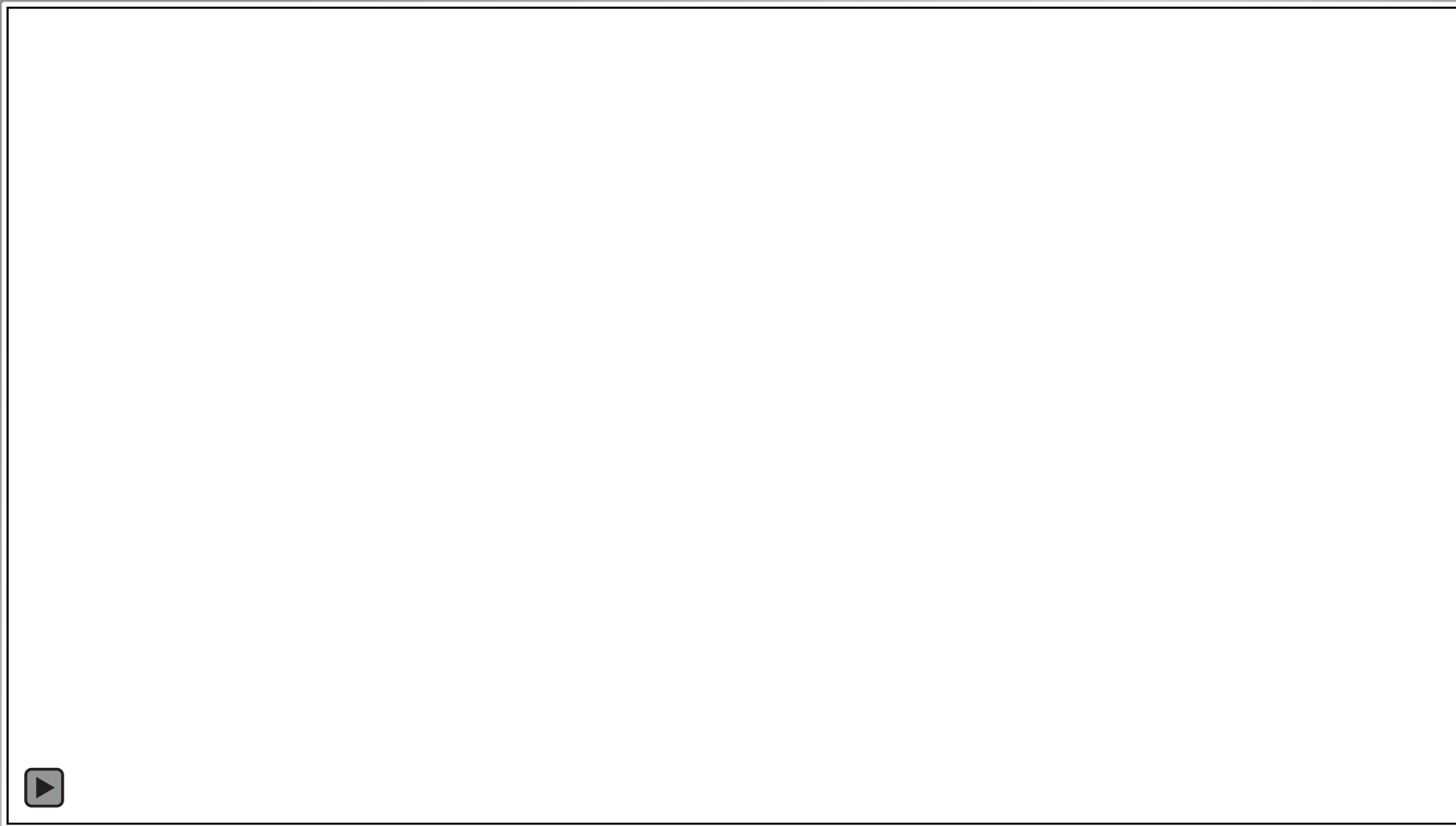


Situational Awareness





Situational Awareness





The View from a UAS



200' AGL

100' AGL

50' AGL

25' AGL





FAA Rules



- **Part 107:** Rules for commercial drone operation
- **Part 91:** General operating and flight rules for civil aircraft
- **Part 21:** Regulates the approval of aircraft design and production organizations and the certification of aircraft products, parts and appliances





Categories of Drone Use



- HOBBY – Recreational use
- CIVIL – Commercial operations
- PUBLIC – Government use only





Hobby



- A drone operator is considered a hobbyist as long as the flight is for enjoyment and not for work, business purposes, or for compensation or hire
- Pass The Recreational UAS Safety Test (TRUST)
- Follow recreational model aircraft rules
- Adhere to federal rules such as:
 - 400 feet max altitude
 - Register drone
 - Visual line-of-sight or use VO





Civil Drone Use (Commercial)



- Use of drone footage for compensation or sale is considered commercial operation or business use
 - Ex: real estate photos, wedding photography, marketing
- Part 107 requires commercial drone operators to obtain a license
 - Must pass a 60-question multiple choice test and a TSA background check
 - Test is taken at FAA testing centers, cost \$175, license is valid for 2 years





Public Drone Use



- Public drone use as defined by the FAA under Part 91 means a public or government entity
- Government agencies (such as police, sheriff, fire) are able to apply to FAA to obtain authorization to operate drones through a Certificate of Authorization (COA)
 - Basic COA is called a “**Blanket COA**” and gives you ability to fly in any uncontrolled airspace
 - “**Jurisdictional COA**” is location bound and includes additional authorizations



Public Safety UAS Program



Phased Approach

- **Blanket COA**
 - Must operate within VLOS
 - VO must be used at all times
 - Daytime operations only
 - 200 feet AGL
 - Must stay 2-5 nautical miles away from all public-use airports or heliports
 - The drone must be registered and display its aircraft registration number
 - A Notice to Airmen (NOTAM) must typically be issued for each operation
- **Jurisdictional COA**
 - Location bound
 - More autonomy
 - Nighttime operations
 - Fly in controlled airspace
 - 400 feet AGL (possibly above)





COA vs Part 107



Certificate of Authorization (COA)

- Issued to an agency
- Takes multiple months to obtain
- More flexibility (with waivers)
- Updated every 2 years
- Develop your own training program and self-certify
- Required to report stats to FAA
- Liability is often on the agency

Part 107 License

- Issued to individual drone pilot
- Easier and faster to obtain
- Certificate to fly under FAA's Small UAS Rule (Part 107)
- Initial license test
- Recertify every 2 years
- Liability on the pilot



COA vs Part 107



- Evenly split among public safety agencies utilizing UAVs today
- Our opinion – GET BOTH
- Both allow you to operate UAVs as a public safety agency, however each method affords you different options and possibilities



Obtaining a COA



- Have your city, county, or state attorney's office draft a letter (known as a Declaration Letter) declaring that your agency is in fact a subdivision of government
- Once the FAA verifies your status, they provide you access to an online portal on the FAA website where you submit the COA documentation



COA Process – Critical Elements



How to Obtain a COA?

- Obtain your COA at

https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/aaim/organizations/uas/coa

FAA FORM 7711-1 UAS COA Attachment
2014-AHQ-11066(28)-333E Page 1 of 6

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO
Aerial MOB, FMRA Section 333 Exemption #11066
2236 Rutherford Rd, Suite 113
Carlsbad, CA 92008

This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.

OPERATIONS AUTHORIZED
Operation of the Hexacrafter 1100 and SkyJib8 Unmanned Aircraft Systems (UAS) in Class G airspace below 350 feet Above Ground Level (AGL) at Dodgers Stadium, Los Angeles, CA under the jurisdiction of Southern California Terminal Radar Approach Control (SCT) for the purpose of commercial filming. See attachment 1.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE
N/A

STANDARD PROVISIONS
1. A copy of the application made for this certificate shall be attached and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.
3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.
4. This certificate is nontransferable.
Note-This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.

SPECIAL PROVISIONS
Special Provisions are set forth and attached.

This certificate 2014-AHQ-11066(28)-333E is effective from January 12, 2015 to September 30, 2016, and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

BY DIRECTION OF THE ADMINISTRATOR

FAA Headquarters, AJV-115
(Region)

January 12, 2015
(Date)

Jacqueline R. Jackson
(Signature)
Manager, UAS Tactical Operations Section
(Title)

FAA Form 7711-1 (7-74)



Part 107 Rules



- Weigh less than 55 lbs.
- Maintain visual line of sight (VLOS)
- No aided visual devices except corrective lenses
- May use visual observer (VO) but not required
- PIC or VO cannot act for more than one operation at a time
- Max speed of 100 MPH
- Max altitude of 400 feet AGL
- Minimum weather visibility of 3 miles





Part 107 Rules (cont.)



- Operate in B, C, D, and E airspace only with ATC permission
- Yield right of way to manned aircraft
- Night operations with appropriate anti-collision lighting
- No operations from a moving aircraft
- No operations from a moving vehicle “unless in a sparsely populated area”
- No careless or reckless operations
- No carriage of hazardous materials



Part 107 Rules (cont.)



- PIC must hold a valid Part 107 remote pilot certificate
- Complete a preflight inspection prior to each flight
- Drone >0.55 lbs (250 g) must be registered with FAA
- No operation of aircraft if physical or mental condition would interfere with safe operation
- External load operations only allowed if it does not affect flight characteristics or controllability





Part 107 Rules (cont.)



- Upon request by FAA make sUAS and/or records available for inspection or testing
- Report to FAA within 10 days of serious injury or property damage of at least \$500
- Deviation from Part 107 rules is allowed only if in-flight emergency





Nighttime Operations

Allows routine operation of sUAS at night under two conditions:

1. The remote PIC must complete an updated initial knowledge test online recurrent training, and
2. The sUAS must have anti-collision lighting visible for at least three (3) statute miles that has a flash rate sufficient to avoid a collision.





Operations Over People



- 4 categories for flying over people
- Sustained flight over an open air assembly includes:
 - Hovering above the heads of persons,
 - Flying back and forth overhead, or
 - Circling above in such a way that the sUAS remains above some part of the assembly.
- Does not include a brief, one time transiting over a portion of the assembled gathering



Operations Over People (CAT 1)



- Less than 0.55 lbs (250 g)
- Laceration protection
- No sustained flight over open-air assemblies unless compliant with Remote ID





Operations Over People (CAT 2)



- Greater than 0.55 lbs (250 g)
- Impact energy equivalent to under 11 ft-pounds of solid object
- Laceration protection
- No sustained flight over open-air assemblies unless compliant with Remote ID





Operations Over People (CAT 3)



- Greater than 0.55 lbs (250 g)
- Impact energy equivalent to under 25 ft-pounds of solid object
- Laceration protection
- Cannot fly over open-air assemblies of people
- Can only fly over people if:
 - Within or over a closed- or restricted-access site and all people on site are on notice that a sUAS may fly over them; or
 - The sUAS does not maintain sustained flight over any person unless that person is participating directly in the operation or located under a covered structure or inside a stationary vehicle.



Operations Over People (CAT 4)



- Airworthiness certificate under Part 21
- Can fly over people so long as the operating limitations specified in the approved Flight Manual or as otherwise specified by the Administrator do not prohibit operations over people
- No sustained flight over open-air assemblies unless compliant with Remote ID

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION-FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1 NATIONALITY AND REGISTRATION MARKS N12345	2 MANUFACTURER AND MODEL Douglas DC-6A	3 AIRCRAFT SERIAL NUMBER 43219	4 CATEGORY Transport
5 AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein. Exceptions: None			
6 TERMS AND CONDITIONS Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.			
DATE OF ISSUANCE 01/20/00	FAA REPRESENTATIVE E.R. White E.R. White	DESIGNATION NUMBER NE-XX	

Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000 or imprisonment not exceeding 3 years or both.
THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS.
FAA Form 8100-2 (04-11) Supersedes Previous Edition





Operations Over Moving Vehicles



- Allowed if drone meets the requirements of Category 1, 2, 3 and either:
 - Remains within or over a closed or restricted access site, and all people within the closed or restricted access site must be on notice that a sUAS may fly over them, or
 - Does not maintain sustained flight over moving vehicles
- A remote pilot may also conduct operations over moving vehicles with category 4 drones under certain conditions.

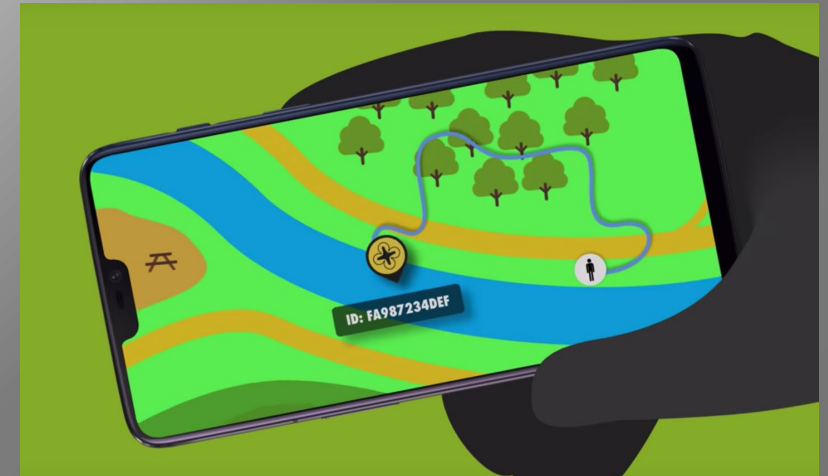




Remote ID Requirements



- Remote ID is the ability of a drone in flight to provide info to other parties
- Helps the FAA, law enforcement, and other agencies find the control station when a drone is flying in an unsafe manner or where it is not allowed to fly
- Will provide info such as the drone's:
 - Identity
 - Location
 - Altitude
 - Control station location
 - Take-off location
- Will take effect September 16, 2023





California Drone Laws



- Senate Bill 807 (2016)
 - Provides immunity for first responders who damage a UAS that was obstructing them while performing emergency services





California Drone Laws



- Assembly Bill 1680 (2016)
 - This law updates section 402 of the penal code to include UAV operations that interfere with emergency services.
 - Makes it a misdemeanor to interfere with the activities of first responders during an emergency.



California Drone Laws



- Assembly Bill 856 (2015)
 - No drone operator is allowed to fly over someone without their permission to take pictures.
 - Prohibits capture of pictures or recordings of people doing personal, private, or family-related activities without permission.
 - Implemented as a direct response to the press invasion of public figures and celebrities.



California Drone Laws



- Assembly Bill 2655 (Invasion of Privacy)
 - Forbids first responders from photographing a crime scene unless they have a legitimate reason to do so. Any kind of photography is included—even drone photography.





California Drone Laws



- Restricted Tool Use
 - Prohibits the use of a motorized vehicle or equipment within any state wilderness, cultural preserve, or natural preserve within the California State Park System unless specifically permitted by the Director of the Department of Parks and Recreation





California Drone Laws



State Highway System

- Hobby and Civil drone pilots may not fly a drone over the State Highway System in California—unless you have a Caltrans encroachment permit
- Highway includes:
 - Shoulders, weigh stations, berms, islands, vista spots, rest places, state highways, and interstates, etc.





California Drone Laws



- Unauthorized Communications with Prisons and Prisoners [4570-4577]
 - A Person who knowingly and willfully flies an unmanned aircraft system over or above the property of a state prison, jail, juvenile hall, camp, or ranch is guilty of an infraction, punishable by a fine of \$500.



UAS Policy Development



- Will overlap with everything in your program
- Funding sources
- Privacy requirements
- Training requirements
- Need to update annually
- 80% of what is in your policy will be driven by other groups





LAFD Training Requirements



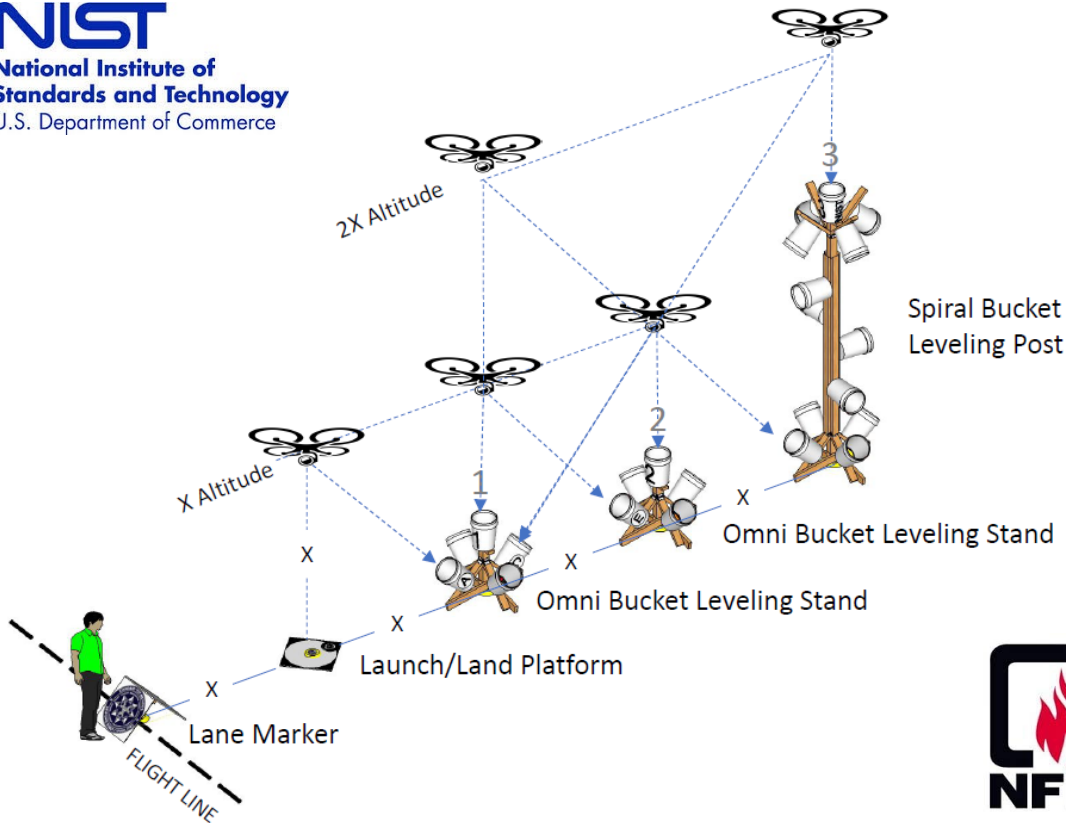
- Policy and procedures in place
- Required to maintain Part 107 certification
- Mandatory 10 hours of logged flight time prior to department certification
- Nighttime operation training
- NIST lane training method (Man 1 & Man 2)
- Passing multiple real-life flights and annual evaluations
- Written department test





Evaluation/Qualification

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce



LAFD UAS PROGRAM REMOTE PILOT EVALUATION/QUALIFICATION CHECK		Check One:	<input type="checkbox"/> Interim	<input type="checkbox"/> Initial	<input type="checkbox"/> Recurrent	<input type="checkbox"/> Post-Accident
DATE:						
Evaluation Key:		D - Demonstrated Ability		K - Knowledge		U - Unsatisfactory
Pilot's Name (last, First, Middle Initial)		Competency Type/Model/Series				
Assignment:		FAA PART 107 Cert & EXP		Location Flight Time		
KNOWLEDGE - (Oral / Written)						
1. Flight Manual		20. Telemetry check				
a. Maneuvers		a. Battery strength confirmed				
b. Aircraft assembly and disassembly		b. GPS signal check				
c. Warnings		21. Controller signal check				
d. Emergency Procedures		22. Fly Mode confirmed (GPS lock)				
e. Alerts		23. Confirm Gimbal operation				
f. Aircraft care and maintenance		24. Camera recording				
2. LAFD UAS Program Policy		25. Camera at 90degree position				
a. FAA PART 107 vs. COA responsibilities		26. Clear Airspace before Launch				
		TAKEOFF				
3. Understanding of the National Airspace		27. Operator "Arming"				
4. Airspace Authorization		28. Operator "Take-Off"				
5. ORAL/WITTEN Exam passed		29. Takeoff time recorded in logbook				
PREFLIGHT		AFTER TAKEOFF				
6. NOTAM Filed and Confirmed		30. Telemetry Check				
7. MFC Dispatch or AirOPs notified		a. Distance from home		Altitude		
8. Safety Briefing		b. Battery%		Controller strength		
9. Weather briefed		c. Camera recording, video on tablet or display				
10. Launch and recovery site identified		PILOT JUDGEMENT				
a. Coordinates recorded		31. Demonstrates good ADM/CRM/ORM				
b. Launch and recovery area appropriate		FLIGHT MANEUVERS				
11. System Inspection		32. Takeoff				
a. Aircraft preflight		33. Altitude control, Turns, Rotation,				
b. Controller buttons and control sticks check		34. Climbs, descents, landing (auto, Manual)				
c. Display/Tablet verified functioning properly		35. Pattern work (discr etion of IP)				
12. Battery voltage checks		36. Orientation awareness				
a. Aircraft (>90%)		37. Altitude control, Turns, Rotation,				
b. Camera (>90%)		38. Fly to POI and collect data demonstrating gimbal position				
c. Controller (>90%)		a. Initiate and execute photo				
d. Tablet (>50%)		39. Climb, depart and return visually home				
13. Aircraft Assembly		a. Demonstrate Return Home functions				
a. Gimbal foam removed		c. Ability to change flight settings in flight				
b. Camera		d. Manual flight (no GPS lock)				
i. SD card formatted		EMERGENCY PROCEDURES				
ii. Camera settings confirmed		40. Lost Link				
iii. Camera attached to gimbal		41. Motor shutdown sequence				
c. Props attached		42. Pause in flight				
d. Aircraft battery installed		43. Near-miss procedures				
a. Trigger point/Discontinuation of flight due to Traffic Conflict		BEFORE FLIGHT				
14. Flight objective briefed		44. Return Home				
15. Controller powered ON		45. Regain manual control				
16. Aircraft powered ON		46. Abort Landing				
17. Tablet powered ON		LANDING AND POST FLIGHT				
18. Wifi connected		47. Pre Landing Check				
19. Aircraft connection confirmed		48. Post Flight protocol and inspection				
Pilot Statement: I have been briefed on the reason for this evaluation flight and understand that I will remain as pilot-in-command of the aircraft during check flight and that I may refuse to attempt any maneuver which, in my opinion may be hazardous or unsafe.						
Approved		Disapproved (See Remarks)				
Remarks:		Pilot's Signature (Sign Prior to Flight)				
		Evaluator's Signature				



Pre-Flight Plan



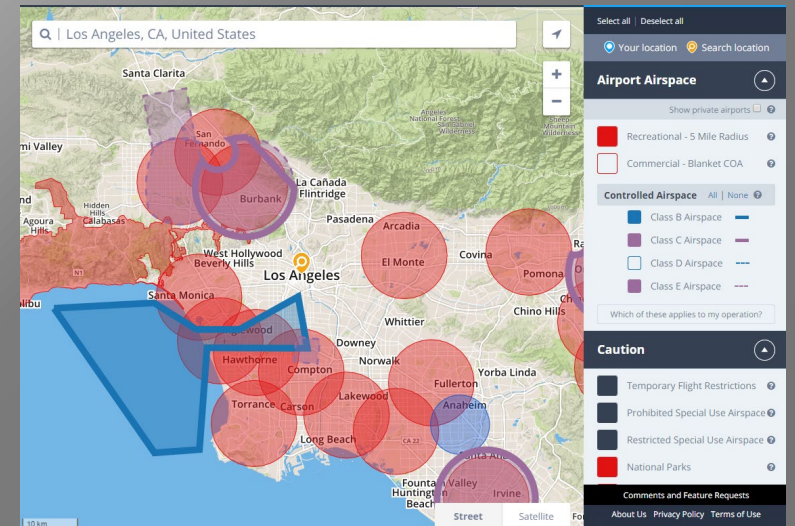
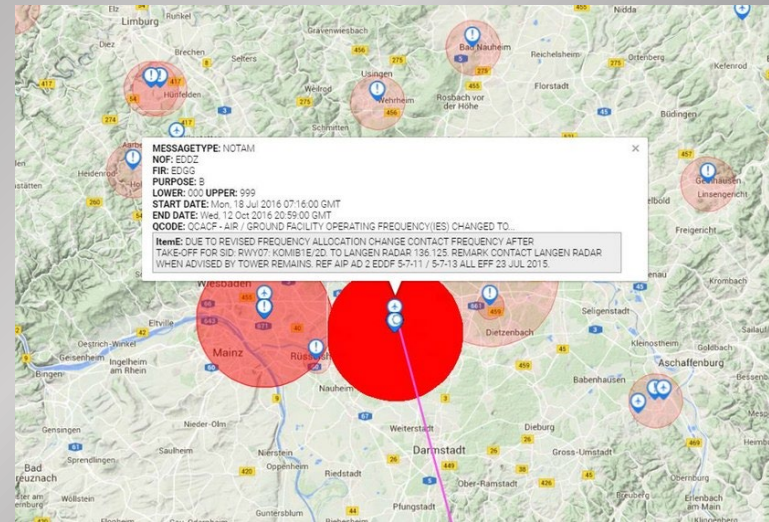
- Correct equipment for the job
- Equipment in good condition
- Weather
- Airspace authorization
- Temporary Flight Restrictions (TFRs)
- Interference/obstacles
- People
- Other hazards
- Flight management software for documentation





Notifications

- Notice to Airman (NOTAM)
 - Required by COA
- Low Altitude Authorization and Notification Capability (LAANC)
 - Controlled airspace
- System Operations Support Center (SOSC) Desk
 - eCOA
- ATC
- Metro Dispatch
- LAFD Air Ops
- LAPD Air Ops
- Port PD

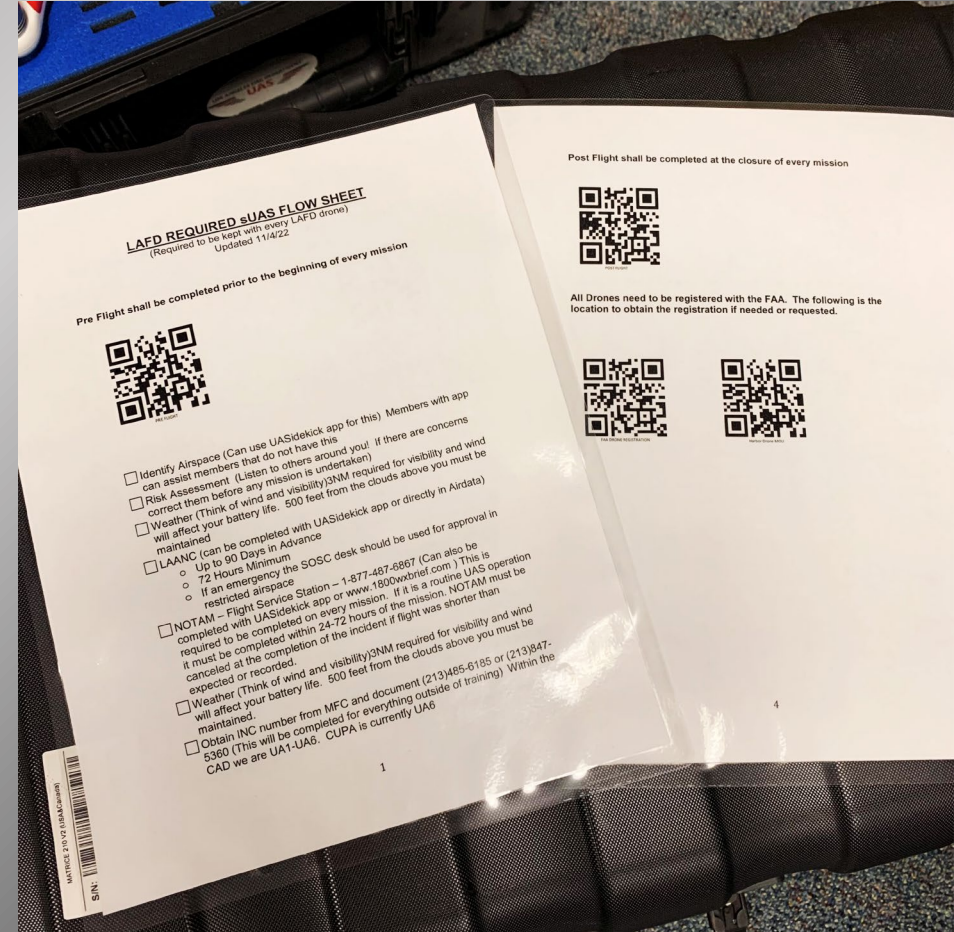




UAS Flow Sheet

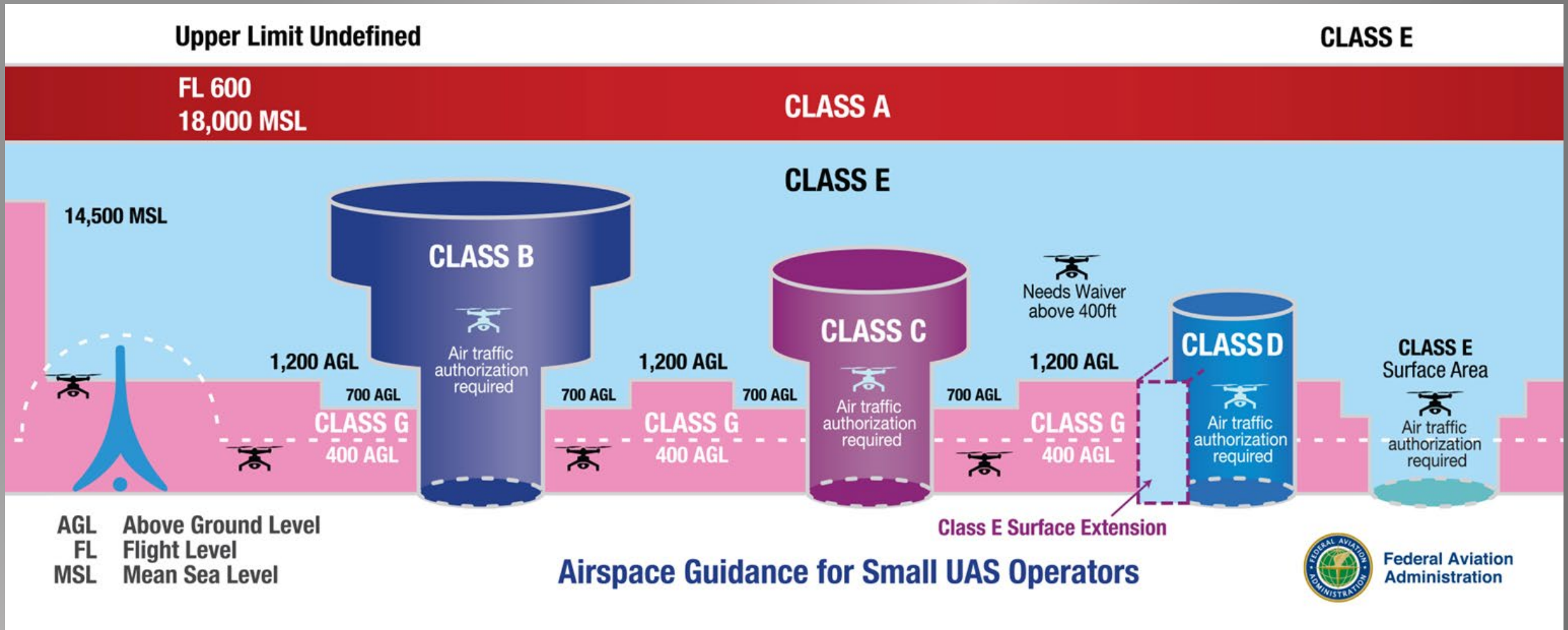


- Developed to assist the pilots with understanding and adhering to all of the flight requirements
- Includes:
 - Registration,
 - Copy of COA
 - Pre-flight/post-flight
 - Notifications
 - Documents and forms

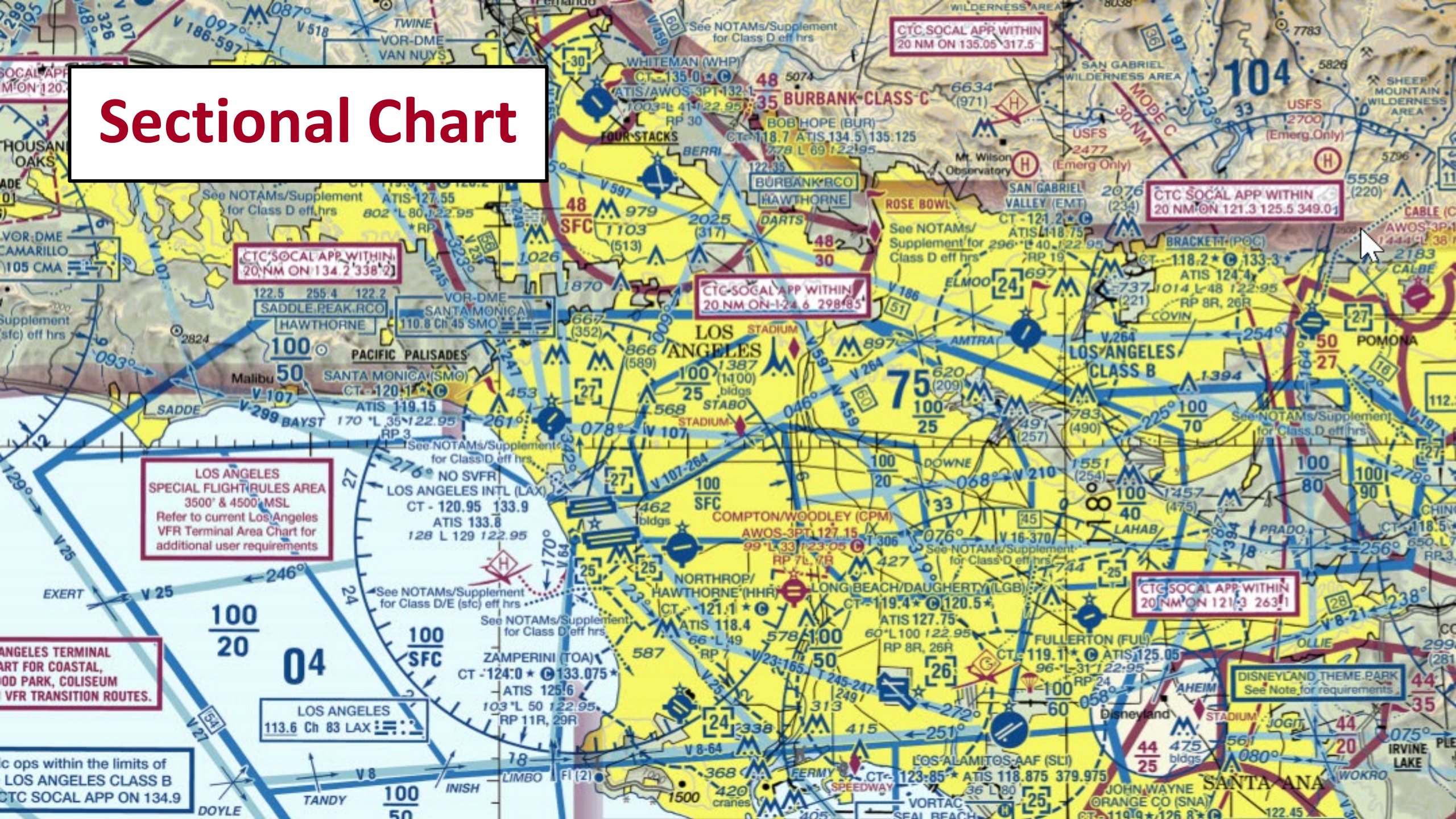




Airspace



Sectional Chart



LOS ANGELES SPECIAL FLIGHT RULES AREA
3500' & 4500' MSL
Refer to current Los Angeles VFR Terminal Area Chart for additional user requirements

CTC SOCIAL APP WITHIN 20 NM ON 134.2 338.2

CTC SOCIAL APP WITHIN 20 NM ON 124.6 298.85

CTC SOCIAL APP WITHIN 20 NM ON 135.05 317.5

CTC SOCIAL APP WITHIN 20 NM ON 121.3 125.5 349.0

CTC SOCIAL APP WITHIN 20 NM ON 121.3 263.1

LOS ANGELES TERMINAL AREA CHART FOR COASTAL, WOOD PARK, COLISEUM AND VFR TRANSITION ROUTES.

LOS ANGELES 113.6 Ch 83 LAX

DISNEYLAND THEME PARK See Note for requirements.

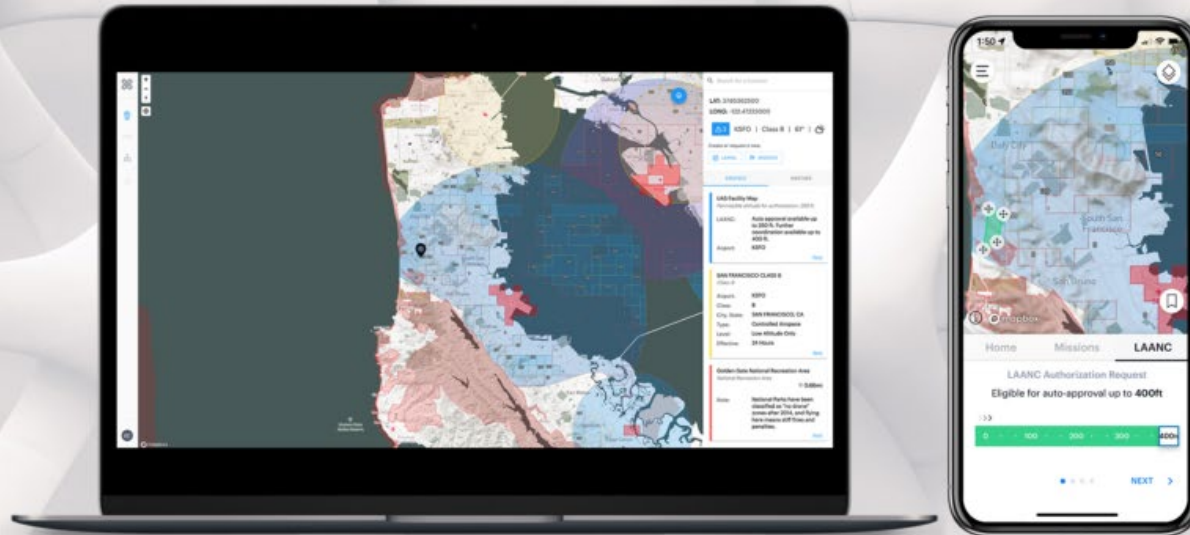
Operations within the limits of LOS ANGELES CLASS B CTC SOCIAL APP ON 134.9



Airspace Apps

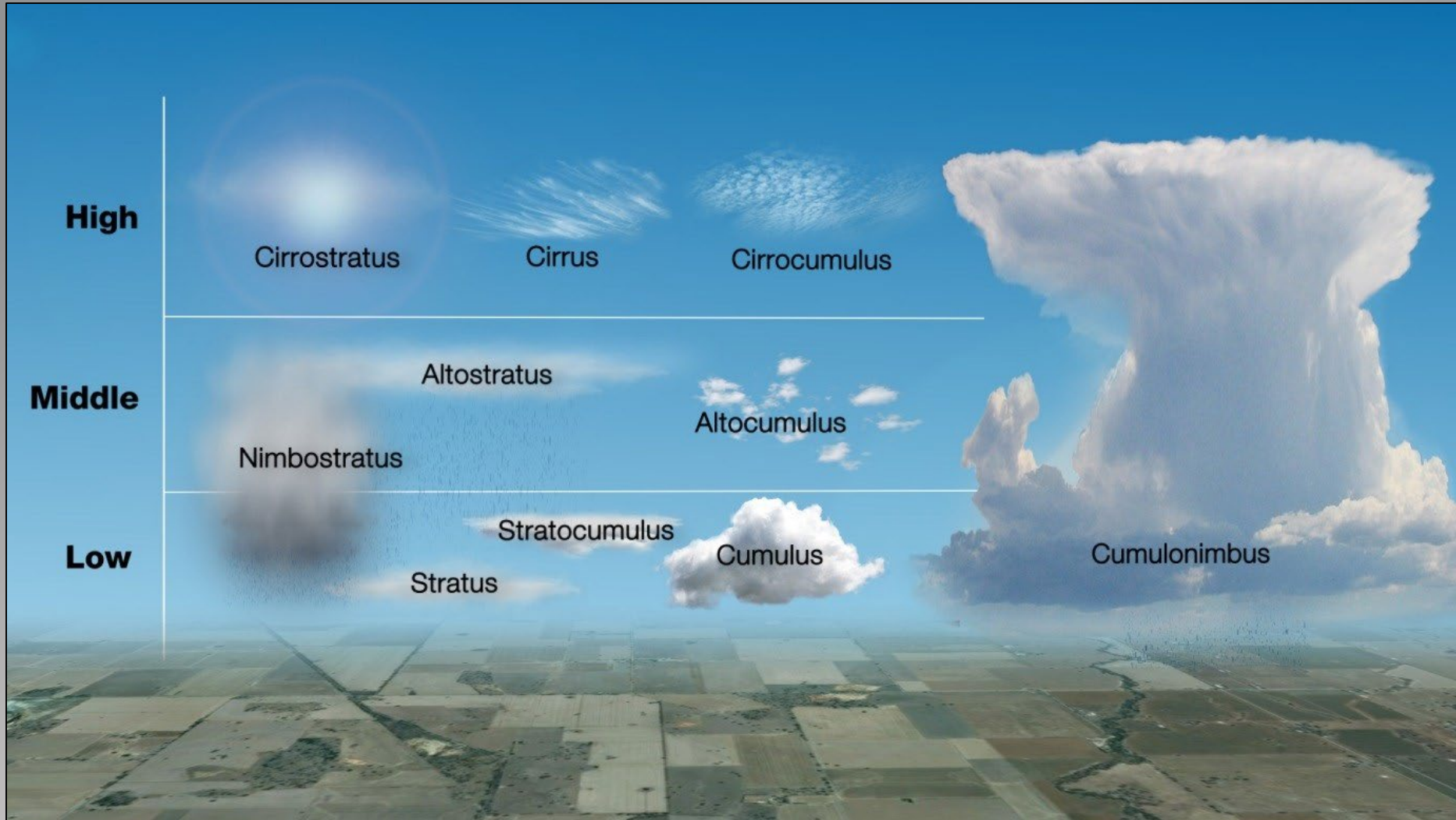


Aloft AIR CONTROL





Weather





Concerns



- Public Sentiment
 - Privacy Concerns
 - Potential for Damage to Public Property
- Unintended Consequences
- Political Impact
- Foreign Drones
- Weather
- Accidents





Foreign-Made Drones



- Concerns with foreign-made drones and the information being gathered
- Unable to fly over certain Federal locations if using foreign products
- Possible new software that will allow foreign products to be locked
- Federal concerns and confusion
- More difficult to purchase





How to keep track of your data!



- Chain of Custody for photographs and videos captured
- Public request for records
- Flight management software





Flight Management Software



- Live streaming
- Pilot information
- Warnings that are issued when flying
- Precise flight path
- Drone health including batteries
- Pilot checklist
- Hours logged



UPLOAD [FLIGHTS](#) MY BADGE REPORTS

All

● ● ● ● ●

Reset

← [1] 2 3 →

[Metric / Imperial](#) [Settings](#)

[Display Map](#)

Pilot in command:

Drone:

OVERVIEW

Training - Phillips 66 Refinery

- Dec 5th, 2019 10:23AM
- Dec 5th, 2019 10:03AM
- Dec 5th, 2019 09:58AM
- Dec 5th, 2019 09:38AM

Drill Tower 81 Graduation

- Nov 21st, 2019 12:48PM
- Nov 21st, 2019 12:40PM
- Nov 21st, 2019 12:21PM
- Nov 21st, 2019 12:14PM
- Nov 21st, 2019 12:03PM
- Nov 21st, 2019 11:15AM
- Nov 21st, 2019 10:59AM
- Nov 21st, 2019 10:29AM
- Nov 21st, 2019 10:07AM
- Nov 21st, 2019 08:04AM
- Nov 21st, 2019 07:41AM
- Nov 11th, 2019 04:46PM

FCF

- Nov 11th, 2019 03:04PM
- Nov 11th, 2019 02:45PM
- Nov 11th, 2019 02:44PM
- Nov 11th, 2019 02:42PM

FCF

- Nov 9th, 2019 08:47AM


Active Flights: **58**
Plan limit: **Unlimited**

Total Photos: **189**
Total Videos: **86**

Total Air Time: **6h 45m 34s**
Total Log Time: **8h 23m 58s**


Total Mileage (all flights)
24 Miles

Longest Flight Time: **18m 33s**




Beginner Extreme

Hottest Battery Temp: **130.9 f**




Cool It's Cooking

Farthest Home Distance: **2,676 ft**




Around Home Far Far Away

Longest Mileage: **10,887 ft**




Hover around Keep it moving

Highest Altitude: **376.3 ft**



Keep it safe Cloud Seeker

Fastest speed: **35.59 mph**



Take it easy Wind Surfer

OK TO FLY? ↗

4800 S Hoover St, Los Angeles, CA 90037, USA



NOW

Good to fly

Temp (F)

56°



Visibility

16 mi



Precip Prob

0%

Wind (mph)

5



Gusts (mph)

6



UV Index

1

Pilots Nearby

0



Kp Index

2

Sats

21



Live Streams

No active live streams

Recent Flights



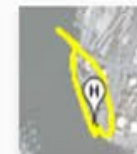
Dec 11th, 2019
10:55am
22 minutes



Dec 11th, 2019
10:32am
9 minutes



Dec 5th, 2019
10:39am
16 minutes



Dec 5th, 2019
10:23am
15 minutes

Alerts

Dec 22nd, 2019

02:03PM

[Pilot Behavior] Inactive Days for All Pilots

Maintenance

Default P4 Battery Basic service is due

Charges

22/20

Flights

68/20

Air Time

12106/12000

Bat-PH4HC-32044H Basic service is due

Charges

17/20

Flights

54/20

Air Time

11225/12000

LAFD UAS6 Basic service is due

Flights

182/20

Air Time

52996/12000

News

Dec 5th, 2019

Autel EVO is now supported

Enable automatic sync with your EVO! To get...



Dec 1st, 2019

Your Drone Pilot Certificate is Ready!

Add a badge to your email signature or website....



Nov 7th, 2019

NEW! Live Streaming with ANY flight app

We are pleased to announce that Airdata now offer...



+ Add Battery

Sort By

← 1 2 3 4 5 →

- Del Bat-PH3-910267**
- [Bat-TB48-301009](#)
- [Bat-TB48-104283](#)
- [Bat-Mavic-320D2D](#)
- [Bat-TB48-512486](#)
- [Bat-Mavic-320B7N](#)
- [Bat-TB47-002647](#)
- [Bat-TB48-300965](#)
- [Bat-PH4HC-3201A0](#)
- [Bat-Mavic-3205GP](#)
- [Bat-Mavic-5405QQ](#)
- [Bat-Mavic-320CDK](#)
- [Bat-Mavic-4403LE](#)
- [Default Mavic Pro Battery](#)
- [Bat-Mavic-5403Q1](#)
- [Bat-PH4-3108FG](#)
- [Bat-Mavic2-3404PG](#)
- [Bat-Mavic2-3601SS](#)
- [Bat-Mavic2-3404V4](#)
- [Bat-PH4-3106LF](#)
- [Bat-PH4-32017L](#)
- [Bat-PH4-3206XE](#)
- [Bat-PH4HC-3106QQ](#)
- [Bat-PH4HC-3106S5](#)
- [Bat-MavicAir-3501QB](#)
- [Bat-MavicAir-3501X8](#)
- [Bat-MavicAir-3501VY](#)

Metric / Imperial	Overview	Usage	Flight History	Merge	Documents	
GENERAL	Battery Name: Bat-PH3-910267			Edit Battery Details		
SERVICE	Type: Phantom 3 Battery					
TRENDS	Model: PH3 (4 cells)					
	Max Capacity: 4480 mAh					
	Operational: Yes					
	<u>Goto Battery</u> : No Set Standard					
	Last Used: N/A					
	Purchased: Aug 12th, 2017 (125 weeks ago)					
	Warranty Until: N/A					
	Manufactured: Nov 1st, 2016 (165 weeks ago)					
	Printed Serial: 1225064910267					
	Internal Serial: 18785/6338					
	Last Flight: N/A					
	Battery Life: 98%					
	Notes: <input type="text" value="Add notes"/>					



+ Add Pilot

All

OVERVIEW

- [Arthur Rodriguez](#)
- [David Danielson](#)
- [Derrick Ward](#)
- [Kurt Corral](#)
- [LAFD FIRE](#)
- [Rene Gonzalez](#)
- [Richard Fields](#)
- [Robert Smith](#)
- [Steven Hamilton](#)

Name	Email	Total Flights	Total Hours	Days since last flight	Next Doc Expiration
Arthur Rodriguez	lafduasrodriguez@gmail.com	13	2.2	19	
David Danielson	LAFDUASDanielson@gmail.com	437	41.8	51	
Derrick Ward	lafduasward@gmail.com	229	17.7	67	
Kurt Corral	lafduascorral@gmail.com		0		
LAFD FIRE	lafduasprogram@gmail.com	22	2	72	
Rene Gonzalez	lafduasgonzalez@gmail.com	1	0	39	
Richard Fields	richard.fields@lacity.org		0		
Robert Smith	resmith5566@yahoo.com		0		
Steven Hamilton	lafduashamilton@gmail.com	58	6.7	25	





What equipment do we have?



- 1 DJI Inspire 1
- 5 DJI Phantom 4 Pros
- 2 DJI Matrice 210's with thermal and cameras
- 2 DJI Matrice 100's with thermal and cameras
- 1 DJI Matrice 600
- 3 DJI Mavic Enterprise Dual (thermal)
- 1 DJI Mavic 2 Thermal Advanced
- 2 DJI Mavic Zooms
- 2 Autel Evo 2 Dual Thermal
- 8 Autel Nano's
- Remote battery charging equipment
- Large external battery chargers
- Lighting
- Department flow sheets with every drone
- LiveU streaming equipment
- Airdata flight management software





What equipment do you need?



- Multiple platforms
- You will have issues if you only have one drone
- How will you fix and pay for your equipment when in breaks?
- Some equipment will not be allowed on Federal sites
- Figure out what you will be using them for to help make your decision





How much will it cost?



- You can run a drone unit for \$10,000
- How much do drones cost? Free or all the way up to \$50,000 for a drone
 - Might be able to get others to pay for your equipment (Donations)
 - Grants are another option for equipment
- Helicopter costs over \$500/hr while drone costs about \$4/hr
- Drones are disposable and people are not
- You need to create value in what you are using the drones for





What if you crash or lose your drone?



- Proper FAA notifications?
- What procedures will your department have?
- Replacement cost?
- Was it a training issue or a misuse of equipment?
- It will happen you just need to do everything you can to reduce the possibility
- If flying with multiple drone's create a deconfliction zone with other drone's





Drone Crash





Safety



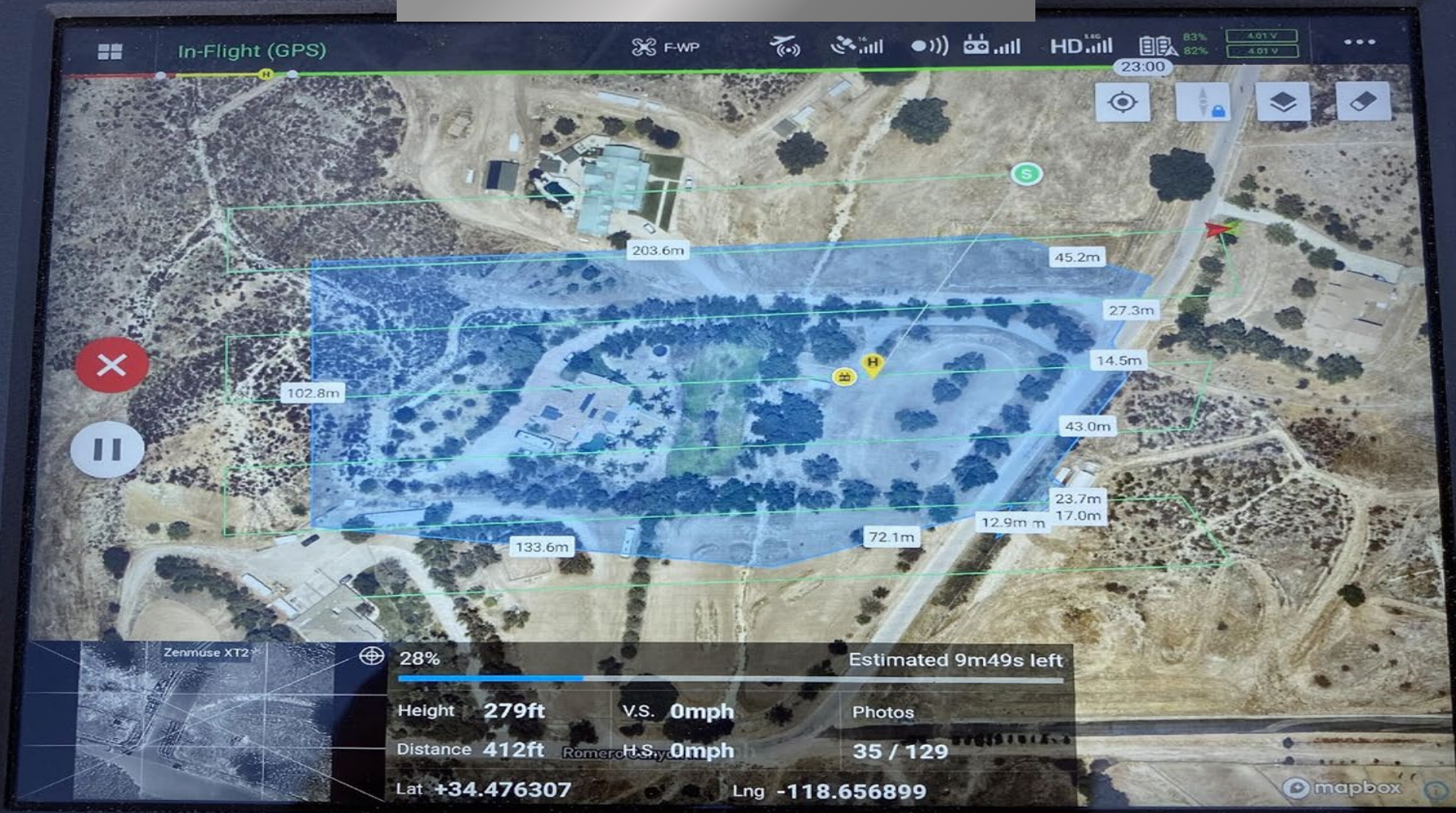


LAFD CUPA Case Examples



- Monitor hazardous materials releases
- Confirm releases have been corrected properly
- Locate hazardous materials at facilities with limited access
- Address City Council and public complaints
- Verify facility site map information
- Assist LAFD resources (i.e. JHAT, Squads, Brush fires, Swiftwater, and Cliff rescue)
- Map terrain in either 2D and 3D

Mapping

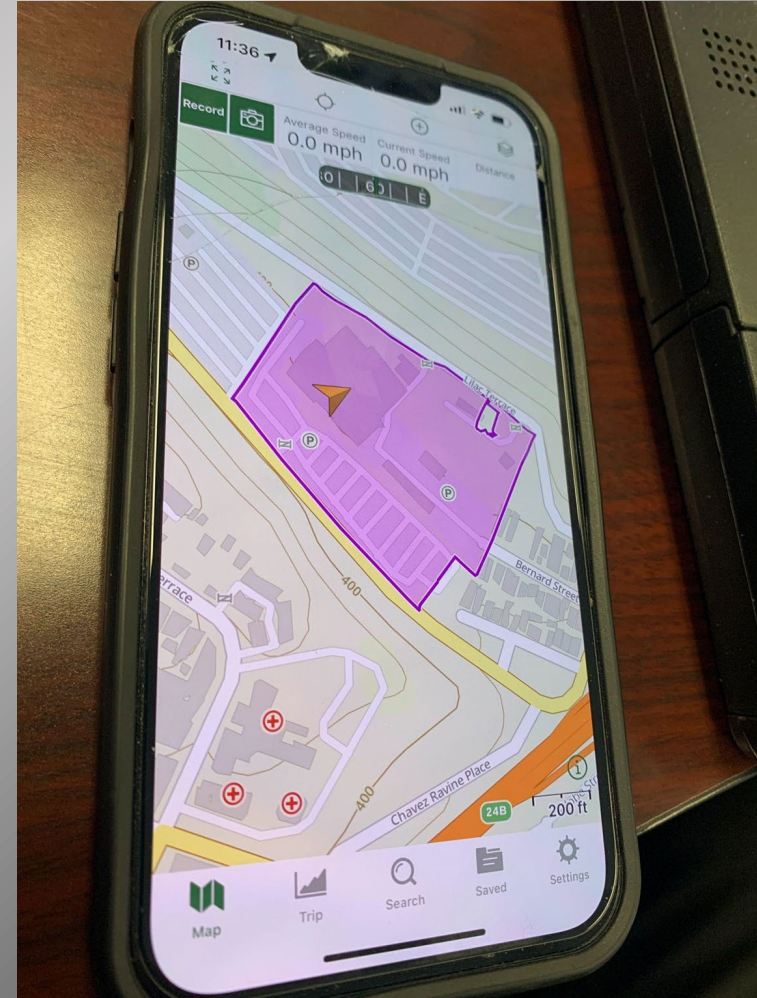




Bad Elf GPS Device

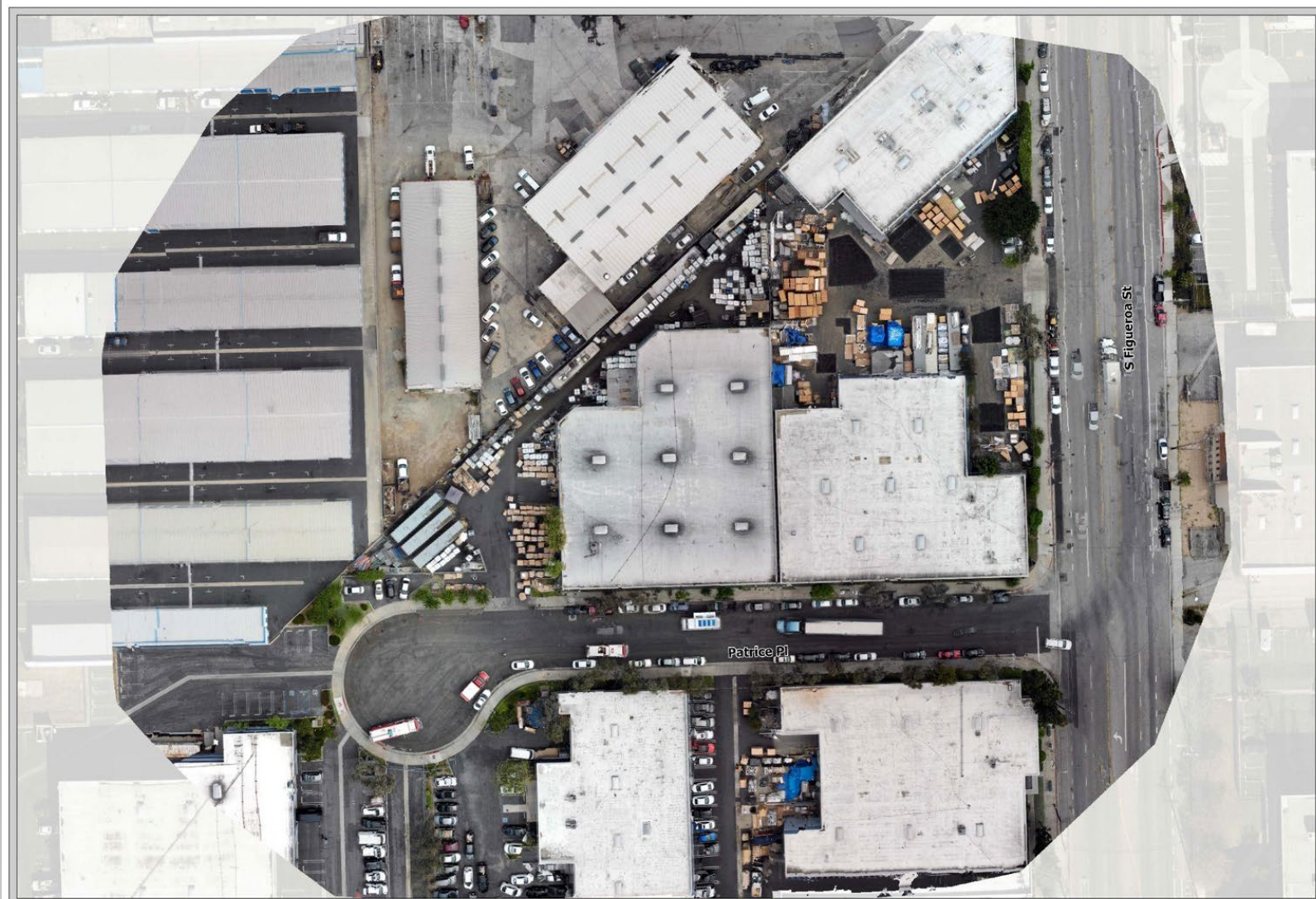


- Allows us to create a perimeter within minutes
- Can be used for brush fires and hazardous material releases





2D Mapping



UAS Map



1:240



2D Mapping



7901 S. Vermont Ave
COVID-19 Testing Site



UAS Map



1:500



2D Mapping



LOT 1
Super Site
CA-LFD-000292



Testing Site

1:400





3D Mapping

- [3D MAP](#)

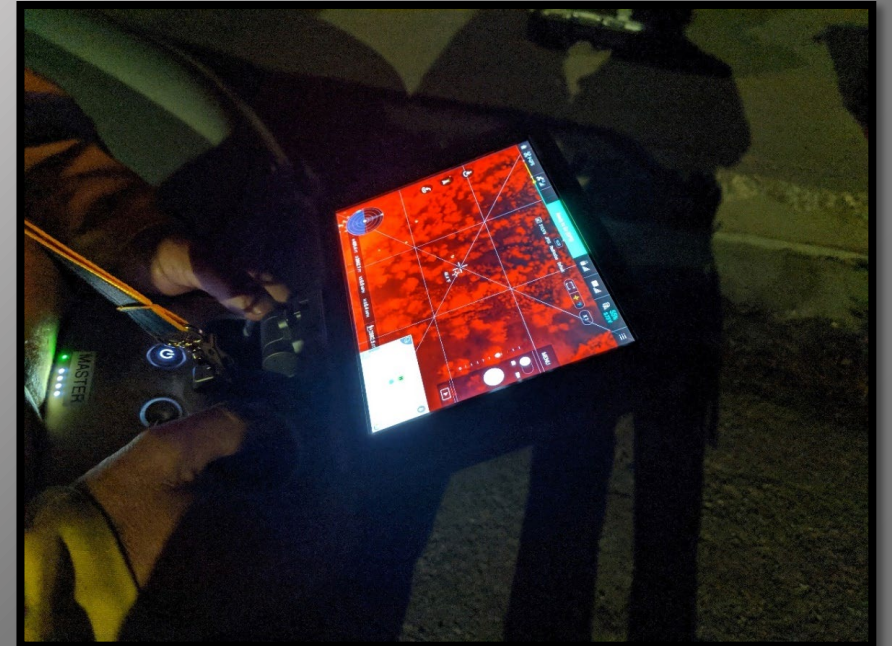




Geofencing



- Some drones have internal software that will keep you from flying in certain areas
More problematic depending on what drones you are operating
- DJI drones frequently affected
Qualified Entities Program (QEP) required to override geofencing
 - Need to keep updated
 - Each person is listed through an email
AND the drone being operated





Is it safe to fly in a hazardous area?

- <https://youtu.be/4CBzW5PjqxM>





How to decon the drone? Or just throw in trash?

- <https://youtu.be/jNR-TW> -OSs





Live Streaming to the IC

LiveU/Airdata/Live Deck/Wireless HDMP





Live Streaming (cont.)



- Can use 5 cell carriers at one time to send the information
- Will store the information and send when in reception
- < 1 second delay time
- Can send the signal to YouTube
 - SECURED
- Battery time over 5 hours
- Worn as backpack
- Anyone granted access can grab the feed and use the image
- Currently department is working with Citizen app to live stream to members





Live Stream Using Airdata



- Great budget friendly option when using multiple platforms
- Works with all drones
- Difficult when there is limited reception
- Can send the live stream to anyone via link

The screenshot displays the Airdata application interface, which is organized into several sections:

- OK TO FLY? :** A central dashboard for flight status at El Sereno Park, 4119 Klamath Pl, Los Angeles, CA 90032. It shows a "NOW" status with "1 pilot nearby, 12 sats below 100ft". Weather data includes Temp (61°F), Visibility (11 mi), Precip Prob (0%), Wind (3 mph), Gusts (6 mph), UV Index (3), Pilots Nearby (1), Kp Index (4.67), and Sats (12).
- Live Streams:** A section showing a live stream from Arthur Rodriguez at 957 Figueroa Terrace, Los Angeles, CA 90012, USA.
- Recent Flights:** A list of recent flights, including three on Dec 7th, 2022, and one on Dec 6th, 2022, with details on time and duration.
- Alerts:** A list of alerts for various pilots, including "Inactive Days for All Pilots" and "Takeoff Battery for All Pilots" for several pilots on Dec 7th and Nov 30th, 2022.
- Maintenance:** A section for drone maintenance alerts, including "Basic Service is due" for Bat-Mavic2-370081, Bat-TB55-210 A-1, CRRU #1, and CUPA#4-2.
- News:** A section for news updates, including "DJI Mavic 3 Classic is now supported", "DJI M3E and M3T are now supported", "DJI Avata is now supported", and "DJI Mini 3 Pro is now supported".



Autel (Live Deck)



- Works without cellular reception
- Almost zero effort to get it up and running
- Plugs into any computer or monitor via HDMI, USB, or Ethernet ports
- Video is displayed at full HD resolution from up to **4.4 miles away**
- Limited to the computer/monitor it is connected to





Wireless HDMI



- Able to connect Remote to TV monitor remotely
- Works great when there is no cell reception





Examples for drone use!





Examples for drone use!



Wilshire
Methane Release



Flying Drones Indoors!



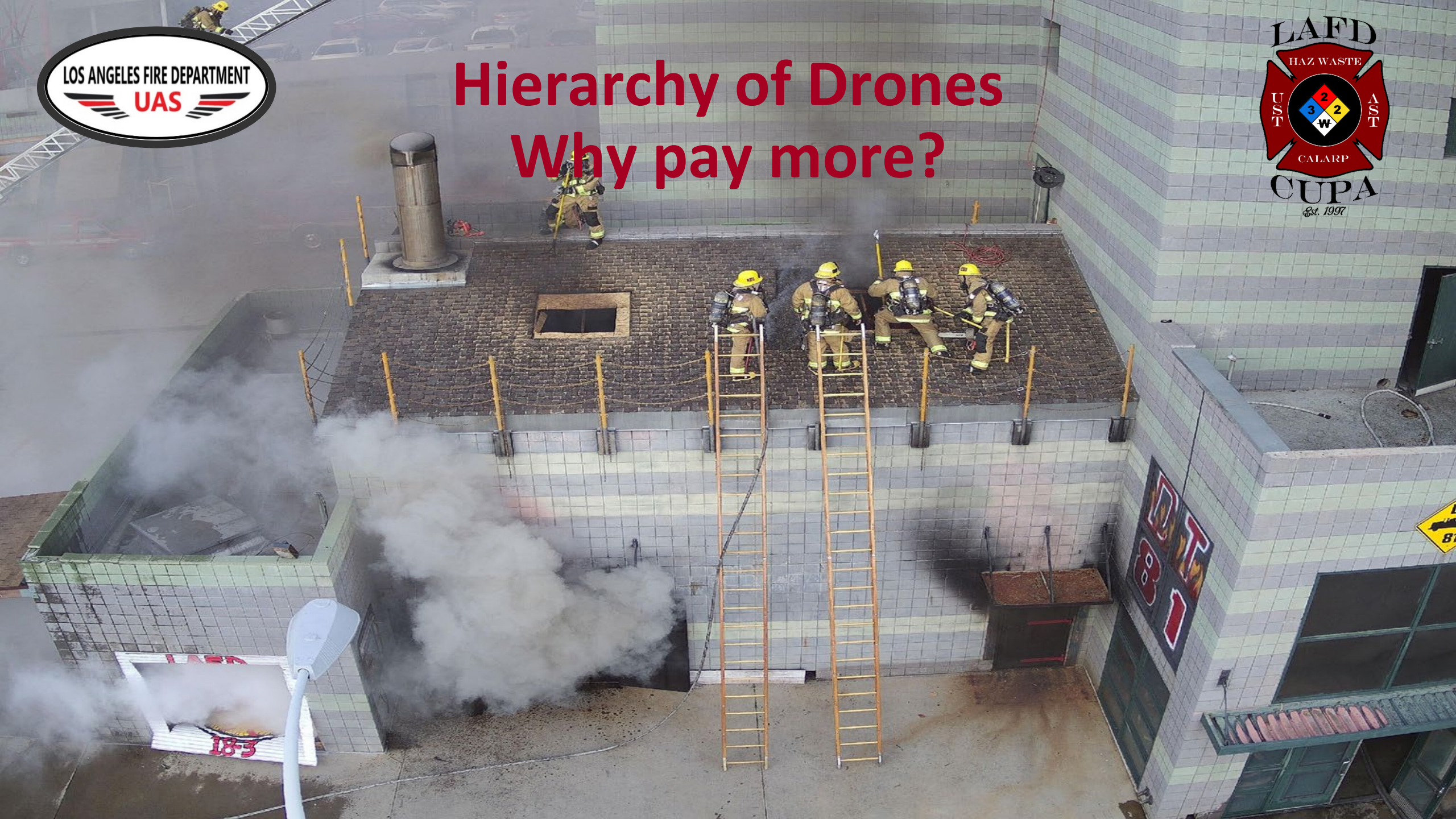
<https://vimeo.com/lafdvideos/insideflying>





Hierarchy of Drones

Why pay more?





Zenmuse Z30



Specifications

- 30x Optical Zoom
- 180x Digital Zoom
- Image Stabilization





Zenmuse Z30 Camera Capabilities





Zenmuse Z30 Camera Capabilities





Zenmuse Z30 Camera Capabilities





Zenmuse XT2



Specifications

- Thermal/Visual/MSX
- 6x Zoom





Zenmuse XT2 Capabilities





Zenmuse XT2 Capabilities



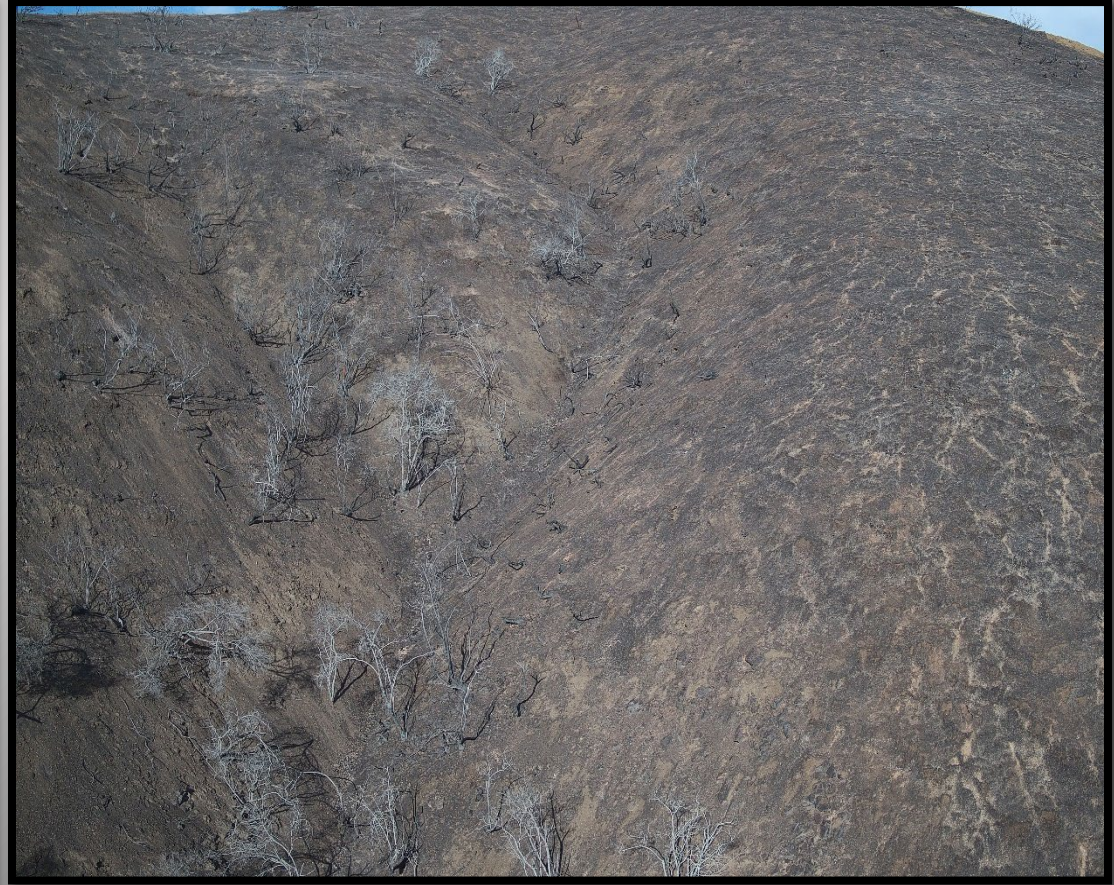
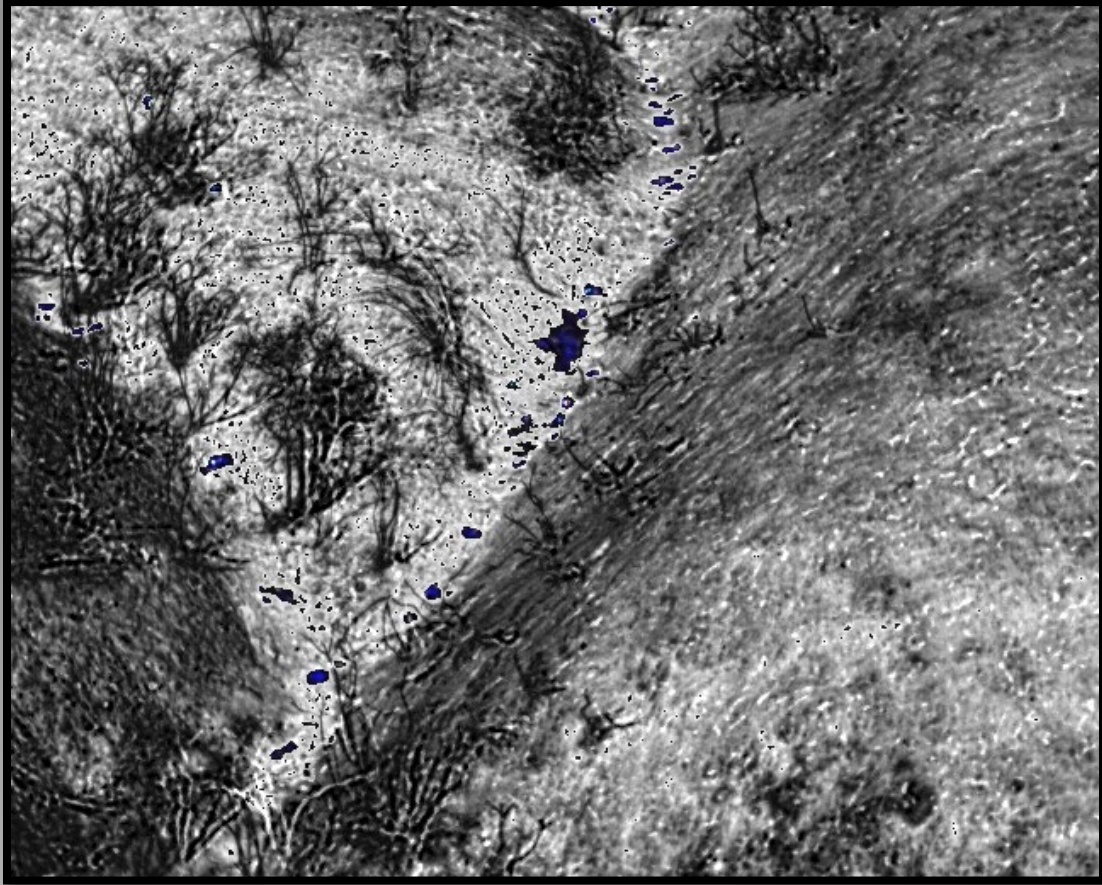


Zenmuse XT2 Capabilities



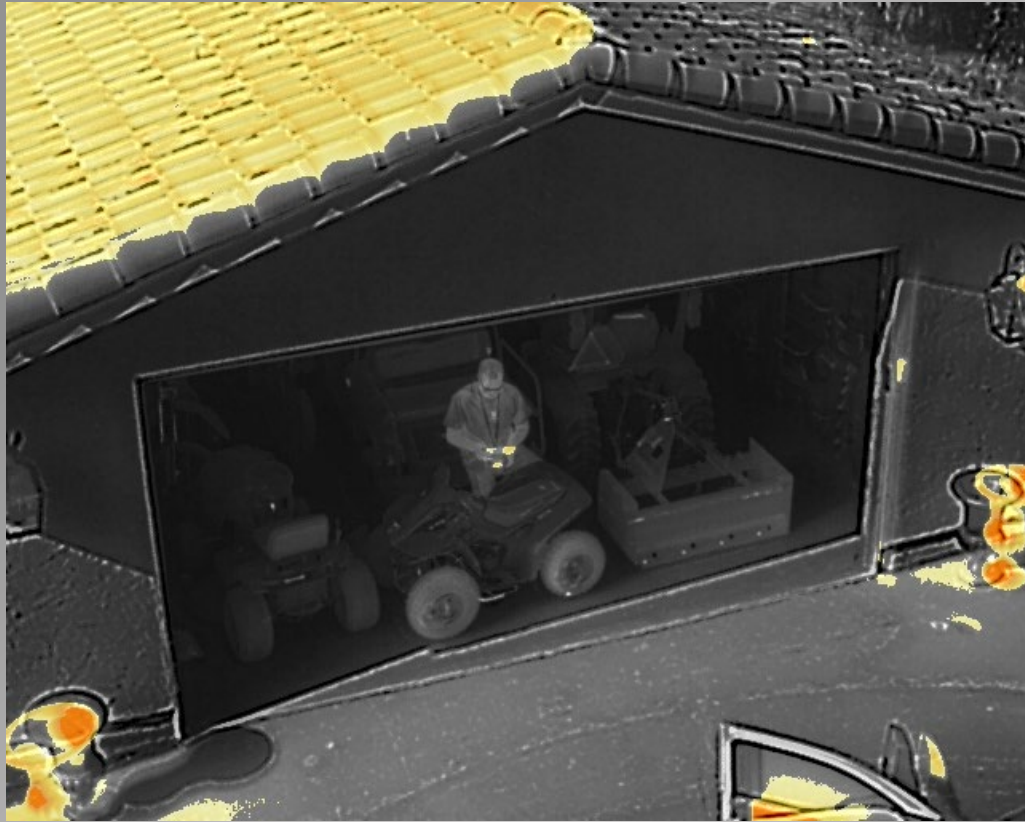


Zenmuse XT2 Capabilities



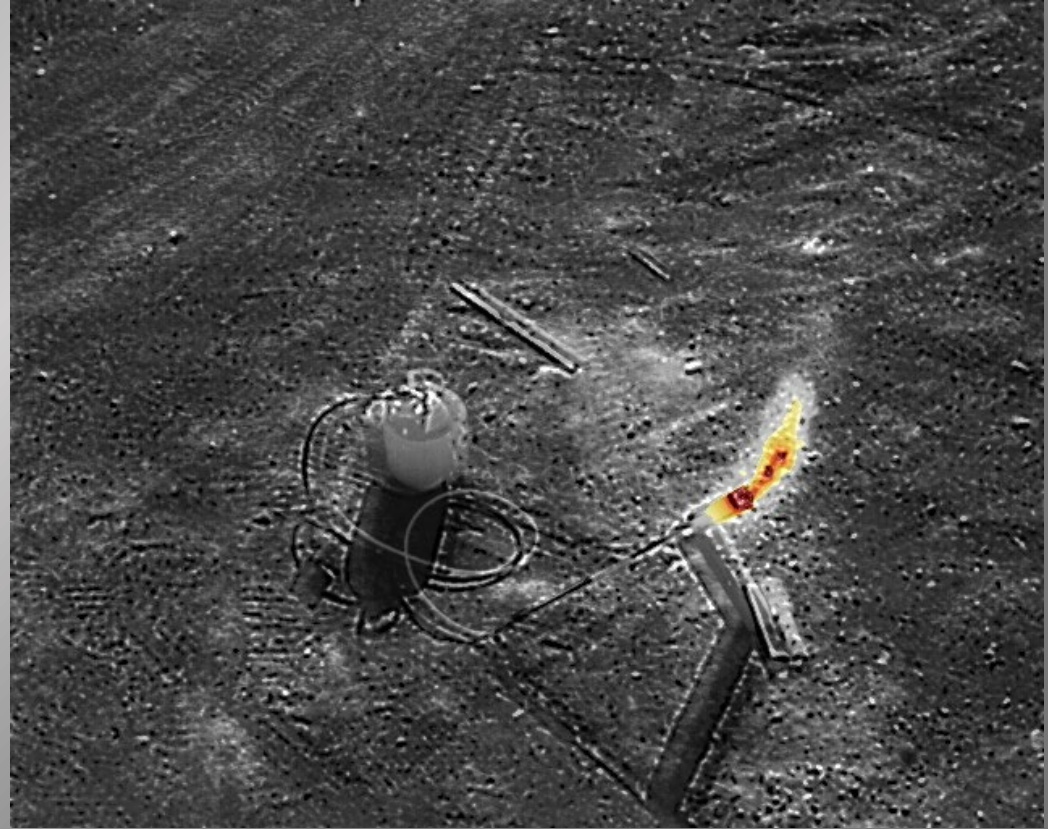


Zenmuse XT2 Capabilities





Zenmuse XT2 Capabilities









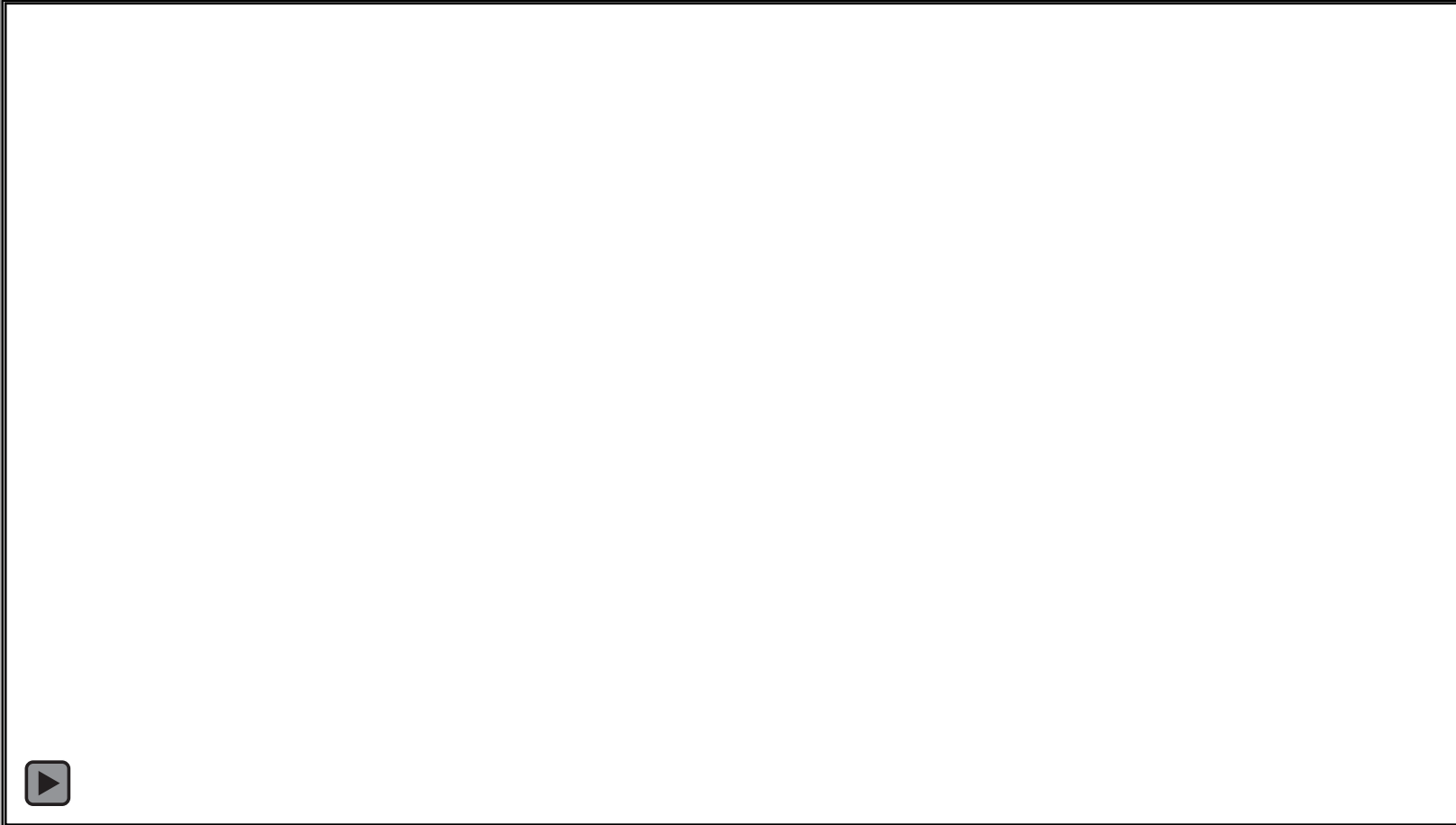


Refinery





Refinery





Personal Radiation Monitor





Personal Radiation Monitor





Multi-gas Meter





Dräger Single Gas Meters



- Chlorine, Ammonia and Hydrogen Cyanide single gas meters
- Meters are small and lightweight allowing for smaller drones to carry the payload





Flymotion Chameleon





Other Attachments







FLIR C360



MUVE C360 Sensor Overview

- Multi-gas detector fully integrated with the DJI Matrice 210
- Real-time continuous monitoring
- Single action lever design with M210 docking station and the calibration station
- 8-Channel Sensor Block
- The calibration station will be utilized to perform routine sensor calibrations and sensor verifications as needed to ensure confidence in the accuracy of the sensors within the MUVE C360.

Standard Sensors Included

Photoionization Detector (PID)

Lower Explosive Limit (LEL)

Oxygen

Carbon Monoxide

Nitrogen Dioxide

Hydrogen Sulfide

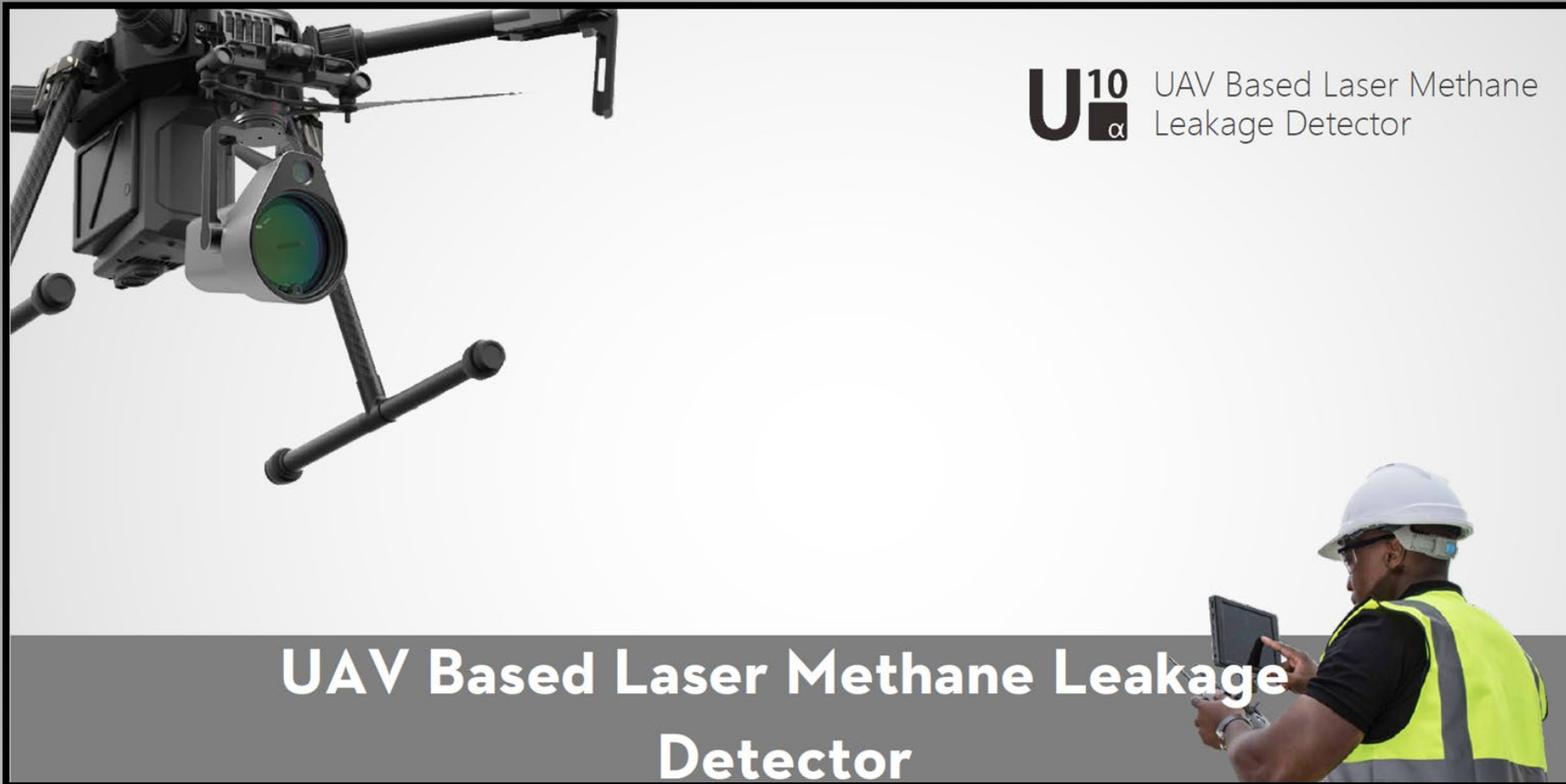
Sulfur Dioxide

Chlorine





Laser Methane Detector



U¹⁰_α UAV Based Laser Methane Leakage Detector

UAV Based Laser Methane Leakage Detector

Multi Meter Viewer from Safe Environment



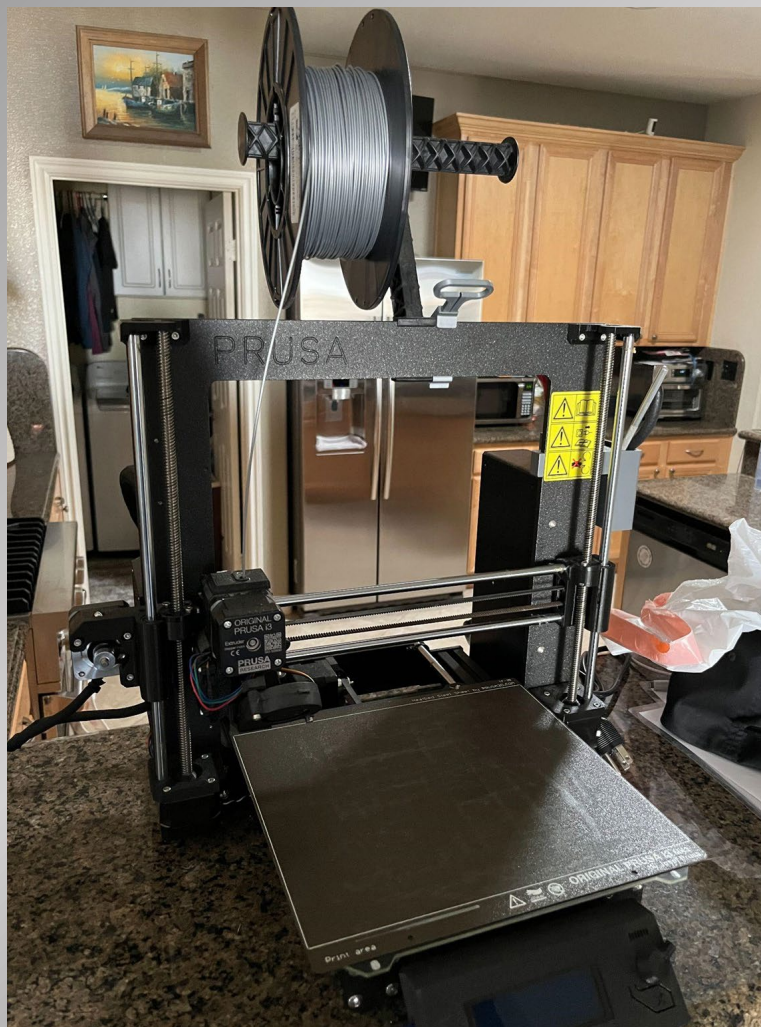


Custom 3D Printed Mounts





We do our own printing and design





Finished Product





What Did We Accomplish?





The Ability to Communicate with People on the Ground!



- Communicate with resources on the ground
- Assist with crowd control
- Direct people during a hazmat spill
- Communicate with cliff rescue personnel, victims in remote or difficult to access areas





Counter Drone Technology

What is the real threat?



- Big deal in the future as more small drones are used in the military world
 - Using drones with machine guns
 - People have tried to assassinate by attaching explosives on drones
 - Drugs and cell phones have been smuggled into jails
 - Fixed wing drones exist that can go for 25 miles
 - The pilot can be very far from the take off location
- Mechanical devices to shoot down drones
- Lasers that can return the drone to the original location or land in pre designated location from up to 1.25 miles away
- Use of eagles to bring drones down





Counter Drone Technology



- Many agencies are using these!
- Detect drones and provide information from 25 miles away
- Will even show what laws have possibly been broken
- Great for TFR's and large scale incidents to help with fixed wing navigation





Where are we now?



- Ongoing collaboration with companies about technologies that will assist with hazardous materials identification and location
- Working with companies like DJI, FLIR, Airdata...
 - The Drone Ecosystem
- Constant testing with the capabilities of the drone platforms
- Evolving pilots and program to grow with the technology
- Re-evaluate needs:
 - Equipment
 - Training
 - Funding



Where is the industry going?



- First Person View (FPV) (DJI Avata)
- Longer battery life
- Vertical takeoff and landing (VTOL)
- Realtime 3D plume modeling
- Beyond visual line of sight



<https://www.youtube.com/watch?v=P3OAXS-wEo>



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