CRITICAL INCIDENT BVLOS WAIVER GUIDE FOR PUBLIC SAFETY
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Introduction
As agencies with developed programs continue to utilize UAS for public safety, we have learned there is a need for the ability to operate a sUAS beyond visual line of sight to preserve the safety of personnel on the ground. This waiver is crucial to the safety of everyone involved with the incident where time is critical. Due to the urgency of the threat, contacting the SOSC to obtain the ECOA for BVLOS is not viable and the time spent could directly affect the lives of all personnel involved. There are a multitude of instances that would require BVLOS to preserve the safety of personnel on the ground as well as the operator of the sUAS virtually every public safety department including, but not limited to high risk tactical instances, HAZMAT/Fire suppression, and major disaster instances. It is important to understand that prior to the utilization of the BVLOS waiver, all deployments will be flown under your personal or agency’s waivers and authorizations. All deployments will be flown within VLOS until it is no longer safe to do so, at which point this waiver will be utilized.

As with the previous guide, Certificates of Authorization for Public Safety, I have created this guide to assist your agency in acquiring the Part 107.91.113 BVLOS waiver. This guide was developed based on my experience obtaining our own BVLOS waiver with the Pearland Police Department. With that being said, this waiver guide is tailored for law enforcement agencies. However, I am certain that other departments can tailor it for their needs as well. The Part 107.91.113 BVLOS waiver process is completed in four stages. Those stages are preplanning, presentation, review and response, and approval.

Disclaimer
This document is designed for completion and submission of COA applications through the CAPS website and will not be effective in submitting Part 107 waivers through drone zone. It should be noted that this document was created May of 2020. Depending on when the reader obtains the document and attempts to submit the applications, the regulations and/or restrictions and/or associated forms may have changed. The verbiage, item selections, and processes depicted and articulated in this document have been successfully approved by the FAA for other agencies. However, verbiage, item selections, and processes advised in this document may not fit your individual agency’s needs, policies, or procedures and may require your own adjustment. The Gulf Coast Regional Public Safety Unmanned Response Team, its members, Pearland Police Department, or myself do not in any way accept any type of liability associated with the waivers you submit. It is the applicant’s responsibility to understand the requirements, restrictions, and regulations of the applications submitted.

Gulf Coast Regional Public Safety Unmanned Response Team
For more information regarding GCR-PSURT, visit our facebook page at https://www.facebook.com/GCRPSURT
For requests to use this copy-right protected work in any manner, email uas@pearlandtx.gov.
Special Thank you

This guide would not have been possible without the guidance and support of York County Department of Fire and Life Safety Deputy Chief Chris Sadler. His guidance and recommendations were instrumental in obtaining our waiver. I greatly appreciate the willingness to help at any time we needed it.

This guide would also not have been possible without the guidance and support of Center for Robotics Assisted Search and Rescue President Justin Adams. His assistance in risk assessment and ConOp analysis provided us the ability to ensure our operations will be safely conducted and helped show the FAA panel the level of pre-planning that was conducted for this waiver.
Preplanning

The first step is to develop a concept of operations (ConOp). The ConOp is your explanation to the FAA’s risk assessment team that your deployments under the waiver will be conducted safely for all parties involved. As previously mentioned, the ConOp should discuss the following:

- Assumptions, Risks, Hazards, and Mitigation plan
- Airspace Description
- How your BVLOS deployments will be conducted.

The following is the narrative we used for our BVLOS waiver:

City of Pearland
COA Waiver Request/Safety Case

The City of Pearland operates a very robust Public Safety UAS program to include 12 aircraft, multiple high zoom cameras, thermal, payload dropping systems, remote spot lighting, a specialized UAS operations and command vehicle and a crew of 6 Pilots. The team trains a minimum of twice a month (day and night sessions) and has deployed on several missions throughout Texas to include missing persons, SWAT, active shooters, bomb/explosive devices, hazmat incidents, large protest events, and many other situations/incidents. Additionally, the team has responded to requests for assistance and/or has conducted training or coordination with the FBI, US Coast Guard and other state and federal entities. The team operates under a Blanket and a Jurisdictional COA. Members of our team are very engaged in Public Safety UAS advancement and integration at the local, state, and national level. Members participate on committees and/or workgroups with entities such as NIST, TXDOT, TDEM, and Drone Responders. The Pearland Police Department also participates in the largest public safety regional team in the State of Texas, the Gulf Coast Regional Public Safety Unmanned Response Team. The purpose of this safety case is to request a Waiver to the requirements of 14 CFR 91.113(b) to allow for Low Altitude/Close Proximity BVLOS operations. The following safety case will show the need for this ability, and how we will conduct such operations safely and with the utmost concern for manned aircraft, other unmanned aircraft, and persons on the ground at all times.

Concept Overview:

Our UAS Team has been on several missions where there was a need to get the UAS in a certain position (50’-100’ AGL) to provide video observation and situational awareness to command staff and tactical teams, however, to do this, the UAS would need to be moved out of the line of sight of the PIC and VO. Because of the dangerous conditions (active shooter, barricaded subject, bomb/IED, hazmat condition, etc.) the PIC or VO could not be placed into a position to see the UAS at this altitude/position. This is because if the PIC or VO could see the UAS, they could be shot by the bad guy, or be in close proximity of the bomb/IED, or hazmat which could be a potentially deadly location for these persons. Therefore, the tactical advantage of being able to gather very important information from the UAS could not be made. Additionally, we have been on several incidents where we did not have cellular communications due to being in a remote location, in an area that cellular service was disrupted due to a weather event, or due to a mass gathering event where the cellular capacity was overwhelmed and a call could not be made. Therefore, an SGI could not be made to request this ability in an emergent situation.
Description of the Airspace:

While our UAS Team can be called upon to respond throughout the State of Texas, for missions requiring the need to fly under this proposed waiver, the primary area will be within class G airspace or within the boundaries of our Jurisdictional COA. We have a great relationship with all of the staff at these ATCTs for KHOU and KEFD under our Jurisdictional COA regularly. The operational airspace requested in this safety case is low altitude/close proximity (at or below 150’ AGL and within 1,000’) of the Pilot in Command of the aircraft.

Description of the System:

The proposed system to be used for operations as described above include the following:

1) DJI aircraft to include the Matrice 210, Mavic 2 Enterprise Series, Parrot Anafi Thermal, and Mavic Mini platforms.
2) Thermal and high powered zoom EO cameras with spotlights.
3) FlightRadar24. This is a subscription based computer program that tracks manned aircraft. The area of operation can be zoomed in on and monitored for aircraft operating in the area. Aircraft information to include destination can be quickly obtained.
4) DroneSense Flight Awareness System- DroneSense allows the pilot and stakeholders to see live feeds of the UAS camera(s), telemetry, battery life, GPS connectivity, RF connectivity, and all of the aforementioned capabilities for other sUAS utilized for the deployment.
5) Portable aircraft band radios with pre-programmed channels for airports and other frequencies for communications with ATCT’s and aircraft.
6) Heavy duty payload carrying and dropping mechanisms for delivering communications devices to hostage takers/barricaded subjects/etc., ammunition to officers, and first aid supplies to officers, medics, or citizens, and/or delivering other critical needs.

Assumptions, Hazards, Risks, and Mitigation Plans:

The flight over people are always a concern. However, in this case the people are either SWAT or other law enforcement persons, the hostages or pinned down persons, or the bad guys. It is assumed that all persons located in the operations areas are participants in the operation and therefore, meet the intent of provisions in our COA for flying over them during this incident. Other hazards and/or risks include:

1) Aircraft not involved in the incident (manned or unmanned) not within LOS of the PIC or VO
2) Inability to see our aircraft
3) Our aircraft can be shot down or otherwise brought down/disabled by bad guy

It is also the assumption of the UAS Team, based on real world incidents and training that the risks associated with our proposed low altitude/close proximity BVLOS operation is almost nonexistent and definitely outweighs the risk. The information gathered by this operation will provide the incident commander, other key decision makers, and tactical leaders with realtime/ instant situational awareness that could save many lives. The teams’ mitigation plans are outlined in the Concept of Operations section below.

Concept of Operations (operational, communications, safety procedures):

The City of Pearland UAS team firmly believes the need for Low Altitude/Close Proximity BVLOS operations can be conducted in a safe manner that meets the expectations of the FAA. We have invested extensive time, effort, training and funding in order to put together a very safe operational plan
to carry out this need. Based on our experience, capabilities and needs, we provide the following procedures for the operations, communications, safety and mitigation of a Low Altitude/Close Proximity BVLOS operation:

1) All operations will be conducted under our Blanket COA (your coa number here), our Jurisdictional (your coa number here), and any provided waivers and addendums.
2) Team personnel shall ensure the airworthiness of each aircraft prior to flights commencing.
3) Distance from PIC to aircraft will not exceed 1,000’
4) Altitude will not exceed 150’ AGL.
5) Ceiling on aircraft/remote will be set prior to flight operations for an altitude that is no higher than the maximum approved ceiling for the airspace as approved in applicable COA’s, LAANC, or SGI approval.
6) Alternate/Emergency landing areas will be identified prior to takeoff. Additionally, crews will follow established procedures per our approved COA’s for loss of GPS, lost link, flyaway, GCS emergency/failure, etc.
7) Return-to-Home provisions to include safe altitude, flight path, landing zone, etc. will be established prior to flight and coordinated with other aircraft and any elevated apparatus (i.e. Fire Department Aerial Ladders, video/weather masts on command vehicles, etc.)
8) A VO will be used for all flights to monitor the aircraft until it drops BVLOS.
9) When aircraft is BVLOS, a dedicated VO will continue to monitor the airspace above the area of the BVLOS operation for other aircraft (manned and unmanned) to “see and avoid” or any other issues of conflict throughout operation and shall resume VO responsibilities of the aircraft when it comes back into LOS.
10) When the aircraft is BVLOS as described above, it may be possible to utilize SWAT or other Law Enforcement personnel, Bomb Squad, Hazmat Technician, or other person(s) in the dangerous area to provide limited VO or situational awareness of the UAS when it enters the area that they are operating in (the area that is BVLOS of the primary VO). If available and used, their communications with the PIC/VO will be via radio/cell phone. It is realized that this is not their primary responsibility, however, to the extent possible the UAS team will utilize this VO resource when available.
11) As needed, a secondary UAS with a secondary PIC and VO shall be used as an elevated over watch of the airspace above the aircraft that is BVLOS to look for any approaching aircraft (manned or unmanned) to “see and avoid” during this BVLOS operation. This secondary aircraft operation shall be coordinated directly with the BVLOS aircraft PIC and VO for maintaining a safe area of operation that is clear of other aircraft (this may not always be needed as sometimes the max AGL is only ~50’ or less). Additionally, the VO shall still maintain look out to “see and avoid” all other operational airspace. The secondary aircraft will only be used to maintain situational awareness of the very small area that the VO cannot see.
12) When operating a secondary aircraft for observing the airspace, a coordination/deconfliction plan shall be in place for altitude separation, Lost Link, Return-to-Home paths, and any other safe aircraft operational needs.
13) PIC will ensure that a crew member monitors FlightRadar 24, DroneSense, and/or other subscribed program to alert crew of aircraft approaching operational area.
14) Applicable ATCT’s will be notified and coordinated with as applicable.
15) Crews will monitor our portable aircraft radio and the applicable channel/frequency for the area in the event direct communications are needed with manned aircraft and/or the ATCT.
16) When applicable, the ADS-B function shall be in use and monitored on our DJI products to monitor for manned aircraft in the area.
17) Anti-collision lighting visible from 3 miles will be utilized on aircraft at all times during these operations (night and day).

18) As needed, an Air Boss will be established for operations involving other aircraft such as MedEvac, military (USCG, etc.), news media aircraft, etc. and a communications plan will be established that all agree on and can conform to.

19) In the event of a miscommunication, lack of communication, or other issue that results in a manned aircraft entering into the direct area of UAS operations, the UAS(s) will immediately yield the right of way and safely clear the area/land as appropriate for the situation presented.

20) UAS Team will train on these BVLOS operations at least quarterly. This training will simulate BVLOS operations, but will utilize actual VO’s at all times.

21) Training records for these BVLOS training sessions will be maintained and readily available for inspection upon request.

NOTE: We considered a requirement to establish a TFR for the area of BVLOS operations, however, we feel that our very low altitude (below 150’ AGL), the ability to visualize the airspace above our operations area, aircraft radio communications ability, and prior communications with the ATCT in the area will provide the safety needs of all flights (manned and unmanned) in the operations area.

Contingency Procedures (lost communication, lost link, flyaway, aircraft/GCS emergencies):

Procedures for the unlikely loss of communications, lost link, flyaway, aircraft/GCS emergency are included in the procedures above.

Accident and Incident Reporting:

Any reportable incident, accident or mishap shall be reported as per the requirements of our COA’s. Additionally, all calls for service of our UAS team are recorded to the NASA Aviation Safety Reporting System: https://akama.arc.nasa.gov/asrs_ers/general.html and are available to the FAA for review as allowed by law.

After-Actions Report:

The UAS Team Leader for each call completes a UAS Deployment AAR at the completion of each deployment. All incidents are also briefed with the entire team at the following training session which occurs every two weeks.

Conclusion:

The City of Pearland has invested over $200,000 in our UAS equipment and hundreds of hours of training and flight time. We are regarded nationally as a highly trained, equipped and experienced team. We take Public Safety UAS very seriously and strive to be on the cutting edge of its utilization for the good of our personnel and the citizens we serve. We feel that there is a tremendous need for BVLOS in the Public Safety UAS world and realize that there are still some issues with providing approval for them. However, our request is not for long distance and/or high altitude BVLOS and should not be grouped into the same category or level as those wanting BVLOS for long distance utility inspections, package delivery, or other such operations. We are asking for Low Altitude/Close Proximity BVLOS with a maximum of 150’ AGL and a maximum distance from the PIC of 1,000’. The area of operation in which the aircraft will be BVLOS is mostly in an area that manned aircraft cannot fly (i.e. below tree line, between buildings, etc.), and the airspace above these areas can be seen by the VO(s) or with the use of a secondary aircraft.
On behalf of the City of Pearland and the other jurisdictions/entities (local, state, and federal) that we provide Public Safety UAS operations for, we appreciate your consideration of this request. Should you have any questions, need clarification, or otherwise would like to discuss this request please contact me at any time. My contact information is listed below.

Brandon Karr
sUAS Program Coordinator
Physical Address:
2555 Cullen Parkway
Pearland, TX 77581
(281) 997-4100 – office
(281) 825-2060 - cell
uas@pearlandtx.gov
www.pearlandtx.gov/police

Once your ConOp is complete, save the document in either a word doc format or adobe pdf. The document will be emailed to the FAA to start the application process.

Application Request
The second step of the preplanning stage is to request a BVLOS waiver is to access your agency’s CAPS account through [https://caps.faa.gov](https://caps.faa.gov). At the bottom of the dashboard page you will notice a black box that states “Attention: If you are requesting a waiver to 91.113 for Beyond Visual Line of Site operations using other than visual observers or a chase plane, do not submit an application unless you have been instructed to do so by AJV-115. For more information on a 91.113 waiver, please submit an email to 9-UAS-91.113Waivers@faa.gov.”

Attention: CAPS is restarted every day at 9:00 AM EST and 3:00 PM EST. If you are working in the application just prior to either of those times, please save your work and exit the application. The system should be available again within a few minutes of restarting.

Attention: If you are requesting a waiver to 91.113 for Beyond Visual Line of Site operations using other than visual observers or a chase plane, do not submit an application unless you have been instructed to do so by AJV-115. For more information on a 91.113 waiver, please submit an email to 9-UAS-91.113Waivers@faa.gov.
In my initial email I submitted the ConOp document and advised I wished to request a BVLOS waiver and have attached the ConOp document to the email. Three days later I received an email confirming the email was received by the FAA and that a teleconference would be scheduled. The scheduled meeting took place a month later. All of the correspondence and scheduling took place via email.
Presentation Phase

This phase is your opportunity to show the FAA that you have researched BVLOS, to explain how you know and believe it can be conducted safely, and to explain what products you have to assist you with risk mitigation. This presentation took place in the form of a teleconference with approximately 23 participants from the FAA. They will ask questions regarding your ConOp for clarification and be provided the opportunity for you to explain your individual needs and capabilities.

I have attached the powerpoint we used below. Bear in mind, I did have videos attached to the powerpoint and ArcGIS mapping for the BVLOS assessment presentation. The slides that only have photos of product were described verbally by myself to explain the purpose, features, and limitations of the products we use. While it is important to show you did your due diligence to emphasize you know your area of operations and you know the capabilities of your systems; how you will be safely conducting BVLOS deployments is the primary focus of this process. One of the challenges I had during the meeting is some of the participants in the meeting only had access to the ppt via pdf and could not see the videos nor the mapping. I strongly encourage you to have a contingency plan for this and other technical difficulties.
Introduction

- Brandon Karr
  - Former CFI- Cert Number: xxxxxxx
    - Single engine, Multi-engine, and Instrument
  - Part 107 Certified- Cert Number: xxxxxxx
  - sUAS Instructor and Curriculum Developer
    - Texas A&M Engineering Extension Service
    - Forensic Mapping Solutions
  - President of the Gulf Coast Regional Public Safety Unmanned Response Team
Introduction

- Established 2017
- Currently Have 4 Part 107 Certified Pilots and 12 aircraft
- Have FAA Authorization to fly day or night
  - Jurisdictional: xxxx
  - Blanket Class G: xxxx
- Flown over 300 missions for public safety
- Participated in 2 large scale SAR events and multiple local mutual aid requests.
- All Patrol Officers have been trained and certified to be visual observers to the night operations standard.

Topics of Discussion

- City of Pearland- Equipment
- City of Pearland- Environment
- Examples of the benefit of BVLOS use on prior missions
- Assumptions, hazards, risks, and mitigation plan
- Concept of Operations
• Best altitude is <150' AGL in most cases (windows, objects, persons, etc.)
• Many times an altitude of 10'-20' or even landing the aircraft is best
• With Pilot located 100' from 75' tree line, VLOS only allows a distance of 200' from the pilot or 100' on other side of tree line at 150' AGL

\[
\tan(\theta) = \frac{opp}{adj} = \frac{75'}{100'} = 0.75
\]

From table = 0.75 = 37 degree

\[
\tan(37') = \frac{opp}{adj} = \frac{0.75\times 400'}{400'} = 0.75 = 0.75\times 400'
\]

\[
300' AGL
\]

\[
400' AGL
\]

533'

City of Pearland sUAS Equipment

![DroneSense Logo](image)
![flightradar24 Logo](image)
Mavic 2 Enterprise

- 20-30 minute flight time
- Omnidirectional collision avoidance sensors
- High quality video 4k
- Zoom and thermal capabilities
- Operating Frequencies
  - 2.400 - 2.4835 GHz
  - 5.725 - 5.850 GHz
- ADS-B In capabilities
- FCC ID: SS3-L1ZE1807

Matrice M210RTK

- 40-minute flight time (two batteries)
- Capable of utilizing multiple cameras
- Collision/obstacle avoidance sensors
- Zoom, Thermal, and High-Resolution Cameras
- Weather resistant
- ADS-B in capabilities
- Operating Frequencies
  - 2.400 - 2.4835 GHz
  - 5.725 - 5.850 GHz
- FCC ID: SS3-M200V21811
Software- DroneSense

Software- FlightRadar24
Pearland Police Command Vehicle

The Command Vehicle is outfitted with multiple monitors to view all available information regarding the sUAS flight. The Command Vehicle is also outfitted to enable communication with all team members and crew for the flight.

City of Pearland, Texas

City of Pearland- Structures/Obstructions

City of Pearland Environment Map

Map created by CRASAR: https://arcg.is/1y5S5m5

City of Pearland, Texas
City of Pearland- Elevation

Pearland PD Bomb Threat

In 2018 Back to Basic Daycare observed a suitcase placed under a day care van. A perimeter was set up and an explosive K9 called to the scene. UAS operations were requested to fly to the scene and attempt to provide images of the suitcase for pre-planning and overwatch. However, the request could not be authorized due to LCS would not be maintained while holding cover at a maximum altitude of 60ft. K9 alerted to the package and was later safely imploded.

City of Pearland, Texas
Combined Agency SWAT Team Training

Pearland Police Department is apart of a Combined Agency Response Team. One active shooter training event we had involved an active shooter with a hostage located at the Crosspoint Church playground inside one of the structures. Communications with the suspect had ceased at the time of deployment. sUAS was deployed to attempt gain eyes on the suspect. However due to the suspect being under cover, this was impossible without loosing LOS to fly lower to see under the structure. Distance from sUAS Ops to Suspect: 450ft Max Altitude to clear buildings: 45’

City of Pearland, Texas

Suspect Tracking

Our agency deploys sUAS and K9s for suspect tracking due to the capabilities of having a birds-eye view of where suspects and Officers are on the ground. This allows for us to keep Officers, suspects, and K9s safer. However, due to equipment limitations maintaining LOS is not always ideal be effective at maintaining Officer safety. Maximum altitude to clear all obstacles in the area: 80ft

City of Pearland, Texas
Suspect Tracking with K9

Due deploying sUAS in a neighborhood and having equipment limitations, this causes VLOS issues. Typically a house or tree line will block my VLOS and will force me to have to gain altitude. With the Mavic Enterprise Dual, its effective altitude with the thermal is a maximum of 100-120 feet. It is important to note that at times the sUAS flying momentarily into BVLOS prior to climbing or passing the residence, at no point in time did I know connection with the sUAS or have an interruption in video.

This video is an example of how important it is to maintain safe observations of the Officers.

City of Pearland, Texas

Barricaded Suspect- SWAT Standoff

Pearland SWAT was dispatched to a barricaded suspect they were serving a warrant for. This suspect was known to have weapons and had numerous prior violent convictions. The Command Post and sUAS launching point was located at the intersection approximately 650ft away. The drive was lined with multiple trees blocking most of the VLOS unless I flew the sUAS at a higher altitude. This vantage point only provided me with an overwatch position. However, the suspect was located in the northern part of the trailer next to a window. If I was able to lower the sUAS BVLOS to view inside the window, I would have been able to verify which room the suspect was in, if the suspect was armed, if the suspect was alive, or if the suspect was alone. All of this information is critical for our team. Maximum altitude to clear all obstacles - 75ft.

City of Pearland, Texas
Concept of Operations
ConOp- Overview

The City of Pearland sUAS team request the ability to fly BVLOS under the following conditions:

1. All flights occur at or below 150 feet AGL; and
2. All flights occur within 1,000 feet of the PIC; and
3. All flights are conducted under either our Blanket COA or Jurisdictional COA, and any provided waivers and/or addendums.

ConOp-Operations

1) All operations will be conducted under our Blanket COA #xxxx, our Jurisdictional COA #xxxx, and any provided waivers and addendums.
2) Team personnel shall ensure the airworthiness of each aircraft prior to flights commencing.
3) Distance from PIC to aircraft will not exceed 1,000’
4) Altitude will not exceed 150’ AGL.
5) Ceiling and distance on aircraft/remote will be set prior to flight operations for an altitude that is no higher than the maximum approved ceiling for the airspace as approved in applicable COA’s, LAANC, or SGI approval.

City of Pearland, Texas
ConOp-Operations

6) Alternate/Emergency landing areas will be identified prior to takeoff. Additionally, crews will follow established procedures per our approved COA’s for loss of GPS, lost link, flyaway, GCS emergency/failure, etc.

7) Return-to-Home provisions to include safe altitude, flight path, landing zone, etc. will be established prior to flight and coordinated with other aircraft and any elevated apparatus (i.e. Fire Department Aerial Ladders, video/weather masts on command vehicles, etc.)

8) A VO will be used for all flights to monitor the aircraft until it drops BVLOS

City of Pearland, Texas

ConOp-Operations

9) When aircraft is BVLOS, a dedicated VO will continue to monitor the airspace above the area of the BVLOS operation for other aircraft (manned and unmanned) to “see and avoid” or any other issues of conflict throughout operation and shall resume VO responsibilities of the aircraft when it comes back into LOS

a) When the aircraft is BVLOS as described above, it may be possible to utilize SWAT or other Law Enforcement personnel, Bomb Squad, Hazmat Technician, or other person(s) in the dangerous area to provide limited VO or situational awareness of the UAS when it enters the area that they are operating in (the area that is BVLOS of the primary VO). If available and used, their communications with the PIC/VO will be via radio/cell phone. It is realized that this is not their primary responsibility, however, to the extent possible the UAS team will utilize this VO resource when available.

City of Pearland, Texas
ConOp-Operations

10) As needed, a secondary UAS with a secondary PIC and VO shall be used as an elevated over watch of the airspace above the aircraft that is BVLOS to look for any approaching aircraft (manned or unmanned) to “see and avoid” during this BVLOS operation. This secondary aircraft operation shall be coordinated directly with the BVLOS aircraft PIC and VO for maintaining a safe area of operation that is clear of other aircraft (this may not always be needed as sometimes the max AGL is only ~50’ or less). Additionally, the VO shall still maintain look out to “see and avoid” all other operational airspace. The secondary aircraft will only be used to maintain situational awareness of the very small area that the VO cannot see.

ConOp-Operations

11) When operating a secondary aircraft for observing the airspace, a coordination/deconfliction plan shall be in place for altitude separation, Lost Link, Return-to-Home paths, and any other safe aircraft operational needs.

12) PIC will ensure that a crew member monitors FlightRadar 24, DroneSense, DJI Airsense and/or other subscribed program to alert crew of aircraft approaching operational area.

13) Applicable ATCT’s will be notified and coordinated with as applicable.

City of Pearland, Texas
14) Crews will monitor our portable aircraft radio and the applicable channel/frequency for the area in the event direct communications are needed with manned aircraft and/or the ATCT.

15) When applicable, the ADS-B function shall be in use and monitored on our DJI products to monitor for manned aircraft in the area.

16) Anti-collision lighting visible from 3 miles will be utilized on aircraft at all times during these operations (night and day)

17) As needed, an Air Operations Boss will be established for operations involving other aircraft such as MedEvac, military (USCG, etc.), news media aircraft, etc. and a communications plan will be established that all agree on and can conform to

18) In the event of a miscommunication, lack of communication, or other issue that results in a manned aircraft entering into the direct area of UAS operations, the UAS(s) will immediately yield the right of way and safely clear the area/land as appropriate for the situation presented
ConOp-Operations

19) UAS Team will train on these BVLOS operations at least quarterly. This training will simulate BVLOS operations, but will utilize actual VO’s at all times

20) Training records for these BVLOS training sessions will be maintained and readily available for inspection upon request

ConOps- Crew Resource Management

**Required Crew Members:**
1) PIC-Primary
2) VO crew
3) Logistics/technical support
4) Airspace/Weather Monitor
5) Incident Command Liaison

**Supplemental/As Needed**
1) PIC-Secondary sUA
2) VO-Secondary sUA
3) Forward secondary Vos
4) Communications
5) Air Operations Boss
6) Data Manager
Conclusion

- Many hours of training and simulating scenarios (under current COA requirements and using VO’s) to develop the operational procedures described in this waiver request
- It is our opinion and belief that Low Altitude/Close Proximity BVLOS missions can be conducted safely under the proposed waiver
- We take great pride in our safety record for the many hours of flight time we have and the many missions we have conducted
- The proposed waiver would allow our team to provide UAS operations over a non populated area or an area that is only populated by those involved in the incident
- Operational area is that in which a manned aircraft typically cannot fly (<150’ AGL) or will not fly without a coordination of airspace
- Not being able to conduct such operations may put lives and/or property at risk

Questions, Comments, or Concerns?

Thank you for your time!
Review and Responses

At the conclusion of the presentation, you will receive a follow up email advising the participants will have x days to provide comments, concerns, or clarification regarding your ConOp. My response window for my review was 7 days. It should be noted that I received an email on the 10th day with the completed review. The review is sent to you via email and the comments and concerns are provided via excel spreadsheet. You will be required to respond to the comments, answer the concerns, and make the requested adjustments. It is important to note, not all 23 participants responded to the review. I have provided a snapshot of the comments and my responses below:

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Comments</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Steve CTP Penalty</td>
<td>ALS 24 Blasts will have to be done as a group. All Blasts will be done</td>
<td>Thank you for your time and consideration Steve.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at the same time.</td>
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<td>Based on recent discussions surrounding training by public agencies, the FAA</td>
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<td>has clarified their position that training operations being conducted by</td>
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<td>public aircraft operators may not be public training operations. In this case,</td>
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<td>the FAA would not be able to do any training in support of operations to be</td>
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<td>conducted under their approved CON.</td>
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<td>As such, it would seem appropriate to hold the city of Portland that all</td>
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<td>training operations must be conducted under 14 CFR Part 107 and as such would</td>
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<td>need to apply for a 107.31 waiver as to be able to conduct training</td>
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<td>operations beyond the pilot’s visual line of sight.</td>
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<td>3</td>
<td>Kevin Armour - A3T-3</td>
<td>Suggested approval as an Extension/Beyond Line of Sight operation with the</td>
<td>Thank you for your time and consideration Kevin.</td>
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<td>provision of the LAA.</td>
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<td>4</td>
<td>John Herman - AUS-H1</td>
<td>No comments or objections.</td>
<td>Thank you for your time and consideration John.</td>
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<td>5</td>
<td>Tony Walsh - NATA</td>
<td>No comments.</td>
<td>Thank you for your time and consideration Tony.</td>
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<tr>
<td>6</td>
<td>NA</td>
<td>No comments from NATCA.</td>
<td>Thank you for the feedback and support.</td>
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<td>7</td>
<td>Jamie Pruneri -</td>
<td>No comments.</td>
<td>Thank you for your time and consideration Jamie.</td>
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<td>Central Service Center</td>
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<td>8</td>
<td>NA</td>
<td>No comments.</td>
<td>Thank you for your time and consideration Jamie.</td>
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<td>22</td>
<td>Andrew Guo - AIV-404</td>
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<td>NA</td>
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Once all your responses are resubmitted, they will be reviewed again until there is no further comments or concerns.
Approval

Once all responses have been finalized, you will receive an email stating: The AJV-P22 91.113 Waiver Team has reviewed and adjudicated your agency’s responses to the FAA comments. The FAA commenters have concurred with the responses. Your agency’s request for a waiver to 14 CFR 91.113(b) continues to move forward in the review process. Please submit a COA application in the FAA COA Application Process System (CAPS) so that a COA number can be assigned and your 91.113 waiver request can continue to be processed.

At this time, you will need to create an application and send them the COA application number to be processed as stated. This could take some time to be processed through legal. Once the waiver is approved by legal, the waiver is approved.