



2021
SMALL UNMANNED AIRCRAFT
OPERATIONS MANUAL v.1
(01 APR21)

Table of Contents

INTRODUCTION	4
GOAL.....	4
DEFINITIONS.....	5
EQUIPMENT.....	7
AUTHORIZED REMOTE PILOT/PERSONAL USE.....	7
SPECIFICATIONS	8
RACE SITE SET-UP	9
RACE SITE sUAS.....	10
sUAS MEDIA.....	11
SPONSORSHIP.....	12
PERSONNEL-RESPONSIBILITIES.....	13
sUAS FLIGHT DIRECTOR	13
REMOTE PILOT-IN-COMMAND (RPIC).....	14
VISUAL OBSERVERS (VO)	14
CALENDARS AND CHECKLISTS	15
TRAINING - QUALIFICATIONS.....	16
TRAINING PLANS	16
INITIAL TRAINING	16
RECURRENT TRAINING	16
PILOT QUALIFICATIONS.....	17
PRE-FLIGHT OPERATIONS.....	18
PLANNING	18
PRE-FLIGHT CHECK LIST.....	19
INSPECTION	20
WEATHER	21
DOCUMENTATION	22
INSURANCE REQUIREMENTS	23
ADDITIONAL INSURANCE	23
OPERATING REQUIREMENTS.....	24
COMMUNICATIONS.....	25
FLIGHT CREW COMMUNICATIONS.....	25
EXTERNAL COMMUNICATIONS	25
AIR SHOW COORDINATION	26
AIR SHOW INTEROPERABILITY.....	26
FAA INTERFACE	27
FLIGHT AREA/PERIMETER MANAGEMENT	28

IN-FLIGHT OPERATIONS	29
POST-FLIGHT OPERATIONS	30
RACE OFFICIALS	31
RACE OFFICIAL MEDIA REVIEW	31
REMOTE PILOT SAFETY RULES	32
IN-FLIGHT SAFETY RULES.....	32
EMERGENCY PROCEDURES	33
sUAS EMERGENCY PROCEDURES.....	33
RACE SITE EMERGENCY PROCEDURES.....	34
ACCIDENT REPORTING.....	35
REFERENCES	36
FINAL RULE OF FAA 14 CFR PART 107	36
APPENDIX.....	37
APPENDIX A – sUAS INVENTORY	37
APPENDIX A1 – sUAS BATTERY INVENTORY	38
APPENDIX B – PRE-FLIGHT CHECKLIST	39
APPENDIX B1 - POST-FLIGHT CHECKLIST	40
APPENDIX B2 - EMERGENCY PROCEDURE	41
APPENDIX B3 – H1 RULE 3F - HELICOPTERS & UAS	42
APPENDIX C - COST & EXPENSE SUPPLEMENT.....	43
EXHIBITS.....	44
EXHIBIT A – FAA REGIONAL OFFICES	44
EXHIBIT B - EXAMPLE FLIGHT PLAN	45
EXHIBIT B - EXAMPLE FLIGHT PLAN (continued)	46
EXHIBIT C – EXAMPLE FAA sUAS REGISTRATION	47
EXHIBIT D - EXAMPLE RACE SITE FLIGHT PLAN MAP	48
EXHIBIT E – EXAMPLE INSURANCE POLICY.....	49
EXHIBIT E – EXAMPLE INSURANCE POLICY (continued)	50
EXHIBIT E – EXAMPLE INSURANCE POLICY (continued)	51
EXHIBIT F – EXAMPLE NAV-AID	52
EXHIBIT G – EXAMPLE SECTIONAL CHART	53
EXHIBIT H - EXAMPLE TFR/FLIGHT RESTRICTIONS	54

INTRODUCTION

The standard sUAS operational procedures will serve as a guide for flight operations planning and execution for H1 Unlimited race events. This operational procedure documents best practices and internal processes for safe and effective flight operations. This includes roles and responsibilities, mission phases, and emergency procedures. The aim is to document everything that needs to be done during a mission, so it can act as a reference point for team members. Flight operations should be conducted under the 14 CFR Part 107 Certificate of Airworthiness. However, not all of these guidelines will apply to all situations. Therefore, use your best judgment and error to the side of safety.

GOAL

To improve H1 Unlimited Hydroplane Race Officiating, provide additional creative camera angles and footage to H1 Live stream, Local TV and Race Site Media Partners, to reduce the overall cost of operations, including; lowering costs to race sites and to keep H1 Unlimited Hydroplane on the forward edge of technology.

DEFINITIONS

Unless the context requires otherwise, the definitions given, shall apply to interpreting the H1 Unlimited Hydroplane sUAS Manual: sUAS (Drones) will be referred to as:

- **“sUAS” or “Drone”** means small unmanned aircraft system and its associated elements (including communication links and the components that control the sUAS) that are required for the safe and efficient operation of the small unmanned aircraft in the national airspace system;
- **“Launch Zone”** means secured area designated for the launch of the sUAS(s);
- **“Landing Zone”** means secured area designated for the landing of the sUAS(s);
- sUAS **“Ground Control Station” or “GCS”** means the interface used by the remote pilot to control the flight path of the sUAS;
- **“sUAS Command”** means the location for all operations of the sUAS including laptops, hard drives, staging of all sUAS, batteries and other equipment required for operations;
- **“RPIC”** means Remote Pilot in Command; person manipulating the sUAS controller who has control of the sUAS;
- **“Pilot”** refers to any sUAS remote pilot in command controlling aircraft;
- **“Flight Director”** means the H1 Unlimited person responsible for the operations of sUAS;
- **“Administrative Director”** means the person responsible for the Administration of the documentation required for the H1 Unlimited race activities;
- **“Air Space”** means all of the air space above the ground included in the race event;
- **“Air Show Director”** means the person(s) in charge of Air Show activities;
- **“Air Boss”** maintains complete control of all aircraft operations within the effective times and airspace described within the event Waiver and Authorization.
- **“Visual Observer(s)”** means the person designated to assist the remote pilot in command to see and avoid other air traffic or objects aloft or on the ground to monitor and report any interference or potential interference of the sUAS flight operation immediately to the “RPIC”;
- **“FAA”** is Federal Aviation Administration;
- **“NOTAM”** means Notice to Airmen; essential information for airspace flights;
- **“TFR”** means Temporary Flight Restriction(s) of Airspace;
- **“Air Comms”** means Air Traffic Radio Communications;
- **“Turn One Drone” or “T1”** means the sUAS designated to hover over Turn One of the race course (first turn after the start/finish line as designated by the predetermined race course map);
- **“Turn Two Drone” or “T2”** means the sUAS designated to hover over Turn Two of the race course (second turn before the Start/finish line as designated by the predetermined race course map);

- **“In-Field Drone”** means the sUAS designated to hover/fly in the infield of the race course as designated by the predetermined race course map;
- **“Waiver”** means FAA issued airspace authorization;
- **“ATC”** means Air Traffic Control;

EQUIPMENT

H1 Flight Director will monitor equipment status, acquisitions, disposals, and advances to technology and update these lists from time to time.

(SEE APPENDIX A – sUAS INVENTORY)

(SEE APPENDIX A1 – sUAS BATTERY INVENTORY)

AUTHORIZED REMOTE PILOT/PERSONAL USE

Company owned sUAS (drones) and associated equipment will be assigned to authorized employees for work-related duties. Authorized personnel will not allow any unauthorized individual to operate the sUAS. If unauthorized use results in an accident, the authorized personnel may be required to make restitution for any damages. Additionally, disciplinary action may be taken. Use of company drones for personal or recreational purposes is prohibited, unless authorized to do so.

SPECIFICATIONS

Each sUAS will be equipped with a camera, gimbal, propellers and a remote control. The sUAS will need to have the ability to fly up to 6000 ft away and hover for up to 20 minutes and the ability to connect to the remote controller on a 2.4 MHz or 5.0 MHz frequency to receive the signal from the controller. The controller will be equipped to output through HDMI to SDI and SDI to HDMI input to race official's receiver/DVR for viewing and recording.

RACE SITE SET-UP

sUAS Command Station will be set up; within the pre-determined location as arranged with race site personnel and Flight Director. Arrival to the race site should be at least one day prior to the event to set-up calibrate, and test all sUAS equipment and connections.

- sUAS Command Station will be in a covered location;
- Power is required;
- Internet is required – minimum speed should be 100+ Mbps down and 50+ Mbps up;
- Location will be within 50 feet of the Race Officials Monitors and Live Stream;
- Tables required as a platform for all drones, batteries, charging stations, laptops;
- Adequate launch and landing zone platforms will be pre-arranged with the race site;
- All cables to support all feeds necessary or available for authorized third parties and media;
- Race site to supply a secured 50-foot partitioned area for the launch and landing zone;

Additional race site media outlets/sources will be pre-determined in advance of the race event with the requirements and equipment needs to support each race event and media efforts.

RACE SITE sUAS

Utilization of other sUAS for race site, sponsor, or other participants, including any/all other sUAS operators, must:

1. Communicate their intent to operate within airspace above the H1 Unlimited race course, at least 90 day prior to the event;
2. Provide a copy of their FAA issued sUAS Remote Pilot Certificate (if expired, provide proof of re-certification);
3. Provide documentation of any/all authorization(s) that is required by FAA to operate as a sUAS Remote Pilot in the designated airspace;
4. Provide Certificate of Insurance listing H1 Unlimited Hydroplane as additional insured at the minimum limited liability as required for the event;
5. Maintain communications with the Flight Director or designated RPIC throughout the event of intended operations;
6. Attend all race site Flight Briefings each morning and/or briefings with H1 Unlimited Flight Director to coordinate operations;
7. All operations will be based on the ability to operate without interference with any/all official race sUAS at any time;
8. Provide a copy of all race footage captured to Flight Director;
9. In the event of an emergency and/or accident all pilots(s) must abort mission and land immediately;
10. Surrender all footage of the emergency/accident to the Flight Director immediately following the event;
11. All race footage will be the Ownership as set forth in the Sanction Agreement, unless otherwise negotiated, excluding any/all emergency and/or accident footage, which will remain the property of H1 Unlimited;
12. No sUAS flights will take place without prior communications with the Flight Director;
13. Pilots must sign H1 Unlimited liability waiver;

All documentation will be provided to the H1 Flight Director and the H1 Unlimited Administrative Director prior to any flight operation(s) in the airspace above the race event for review of accuracy and completeness of required documentation.

sUAS MEDIA

The Flight Director will control the disbursement of all media as requested by authorized departments and as directed by the Chief Race Official.

In the case of an emergency, no information or media will be released to the media outlets unless, authorized by Chief Race Official, Event Emergency Manager or Incident Commander.

With the approval of the Air Boss, Event Emergency Manager or Incident Commander, the Flight Director will authorize RPIC(s) to help in emergency efforts and any additional media coverage.

SPONSORSHIP

The Administrative Director (with approval of the Board) shall determine:

- Appropriate fee for sUAS coverage sponsorship and arrange for sponsorship activation;
- All sponsorship fees shall be submitted promptly to the H1 Treasurer;
- All In-kind sponsorships must be approved by the Administrative Director;

PERSONNEL-RESPONSIBILITIES

The Flight Director and/or Remote Pilot-In-Command (RPIC) is responsible for the overall safety during sUAS operations.

sUAS FLIGHT DIRECTOR

1. The Flight Director shall maintain a file for each operator and sUAS. The file shall include copies of training records, flight incidents, maintenance records, etc.;
2. To be current and to update the RPIC and visual observer(s) with all federal and state regulations as they change;
3. Shall ensure that the RPIC has all documents required as per FAA, state, city and department guidelines;
4. Will ensure that the RPIC is current with the training and knowledge;
5. To ensure all sUAS are registered and in airworthy condition;
6. Prepare Flight plans as required; (*SEE EXHIBIT B – EXAMPLE FLIGHT PLAN*)
7. Obtain necessary insurance as required by each race venue including additional insured;
8. Will actively recruit flight personnel;
9. Responsible for all communications with H1, RPIC(s), Race Officials, FAA, Air Boss and other race site personnel as necessary;
10. Will work with the H1 Administrative Director to maintain this Policy;
11. Will participate with the H1 Technical and Rules Committee to update the H1 sUAS Rules and Regulations;
12. Maintain all H1 RPIC(s) and backup RPIC(s) information, certifications and training as required;
13. Will communicate with H1 Media and Sponsor interfaces as necessary;
14. Will direct and monitor H1 sUAS support personnel including visual observers and flight crew(s);
15. Conduct Flight Briefings for all RPIC(s), including any FAA Authorized race site sUAS pilots;
16. Participate in daily Air Boss Briefing(s) if event site has an active airshow waiver concurrent with race activities;

REMOTE PILOT-IN-COMMAND (RPIC)

1. To keep current all FAA certifications and recurrent training necessary for operations.
2. To be considered for selection as an operator, applicants must meet the requirements for and successfully pass the FAA Remote Pilot Certification exam and obtain certification or permit in order to be accepted into the sUAS crew;
3. Operators interacting with Air Traffic Control (ATC) or Terminal Radar Approach Control Facilities (TRACON) shall have sufficient expertise to perform that task readily. Operators must have an understanding of, and comply with FAA Regulations applicable to the airspace where the sUAS operates;
4. An operator's primary duty is the safe and effective operation of the sUAS in accordance with the manufacturers' approved flight manual, FAA regulations, and State, City and department policy and procedures. Operators must remain knowledgeable of all FAA regulations; sUAS manufacturers' flight manual and bulletins, department policy and procedures;
5. Operators may be temporarily removed from flight status at any time by the Flight Director, for reasons including performance, proficiency, physical condition, etc. Should this become necessary, the operator will be notified verbally and in writing of the reason, further action to be taken and expected duration of such removal;

VISUAL OBSERVERS (VO)

1. Visual Observers must have been provided with sufficient training to communicate clearly to the RPIC, any flight and/or turning instructions required to stay clear of conflicting traffic and obstacles;
2. A Visual Observer's primary duty is to inform RPIC of anything that may affect the RPICs primary duty (see and avoid);

CALENDARS AND CHECKLISTS

The Flight Director will establish and maintain the following calendars, including responsibilities, FAA Waiver and approvals, activities, events and briefings and promptly submit the same (including revisions) to the Administrative Director:

- Annually;
- Race Week;

The Flight Director will develop the following checklists and append same to this Policy as:

- Pre-Race Checklist; (*SEE APPENDIX B PRE-FLIGHT CHECKLIST*)
- Post-Race Checklist; (*SEE APPENDIX B1 – POST-FLIGHT CHECKLIST*)
- Emergency Checklist (Covering items/actions in Section “Emergency Procedures” including ‘Knock it Off’ or ‘Abort’ callout procedures;

TRAINING- QUALIFICATIONS

The key to continued safe operations is by maintaining a professional level of competency. The first step in this process is establishing minimum qualifications for selecting operators, and the second step involves training those personnel.

TRAINING PLANS

1. All operators will have a training plan on file that outlines training objectives. This training plan will be held in conjunction with the pilot's normal training file per drone operations policy;
2. The approved training plan is developed by the Flight Director;
3. All deployments or exercises are documented and count toward operator training;
4. It is the Flight Directors responsibility to verify the training file contains all pertinent information;

INITIAL TRAINING

1. Operators must obtain the FAA Remote Pilot Certification. In addition, the operator should, at a minimum, have knowledge of the rules and responsibilities described in 14 CFR 107, Basic VFR Weather Minimums; knowledge of air traffic and radio communications, including the use of approved ATC/pilot phraseology; and knowledge of appropriate sections of the Aeronautical Information Manual.
2. In conjunction with fulfilling all training requirements for RPICs duties, the new operator must also become familiar with sUAS operations, the aircraft and its equipment.
3. Before an operator can fly as an H1 Unlimited RPIC, he/she must complete at least one race season of flight training with the assigned Flight Director to show proficiency of the flight exercises and the airframe. This must be accomplished to show their ability and knowledge of the sUAS. The ability to communicate with Air Boss, ATC, FAA communications and race site personnel.

RECURRENT TRAINING

1. All operators shall maintain proficiency in their RPIC abilities. Operators who do not have any documented training or flight time within a span of 60 days will have to show proficiency before being a RPIC during a sUAS operation or exercise;
2. Recurrent training is not limited to actual operating skills but includes knowledge of all pertinent sUAS/aviation matters;
3. Failure to prove proficiency can result in removal from sUAS responsibilities;

PILOT QUALIFICATIONS

Remote pilots must have a valid unmanned aircraft system rating/certificate for the operation of the equipment by passing an FAA knowledge examination.

- Remote pilots must complete recurrent training courses, as required by the FAA
- Remote pilots must complete initial training on company policies and procedures spelled out in this document, as well as complete “flight” training on the specific small unmanned aircraft system (sUAS) assigned to them.
- Remote pilots understand airspace classifications and notification requirements.
- Remote pilots understand the FAA Best Practices for Privacy, Transparency, and Accountability.

Remote pilots shall have no medical or physical conditions that can affect the safe operation of the small unmanned aircraft system. Impairments that could influence operation include. But are not limited to:

- The temporary or permanent loss of dexterity needed to operate the control system
- The inability to maintain “see and avoid” diligence due to blurred vision
- The inability to maintain proper situational awareness due to illness and or use of medications that caution the user to not drive or operate heavy machinery after taking.
- A debilitating condition, such as a migraine headache or moderate-to severe body aches or pains, that would render the remote pilot unable to manipulate the controls
- A hearing or speaking impairment that would inhibit the remote pilot from communicating
- Consuming alcohol concentration of .04% or greater
- Using a drug that affects the person's mental or physical capabilities

PRE-FLIGHT OPERATIONS

Preflight activities are the duty of the RPIC before the start of the flight operation. Activities include inspection of the aircraft, assessment of the operating location, briefing crew members involved in the operation, and equipment checkouts. All flight operations should be conducted in accordance with the provision of 14 CFR Part 107, state and local regulations, and the operator's manual for the subject aircraft. All updates/upgrades will be performed prior to departure for each race event. No equipment updates will be performed during the race weekend to avoid inconsistent firmware.

PLANNING

1. The sUAS Command Station will be pre-determined with race site personnel and/or emergency operations command;
2. Race Site will be responsible to provide secure Launch and Landing zones from general public. Only pilots and supporting personnel will be allowed in the launch and landing zone areas;
3. The sUAS flight crew should be familiarized with all available information pertaining to the flight such as; take-off/landing, including but not limited to the operational limitations of Part 107, weather conditions, hazards, no fly zones, etc.;
4. RPIC will ensure the location for take-off and emergency landing are adequate upon arrival at the location. At least one emergency landing area should be identified before the start of operations;
5. All RPIC(s) should be aware of all surroundings in the event that an emergency landing is necessary. This includes the ability to recover the sUAS;
6. Obtain insurance per race site requirements;
7. Create Flight Plan and review with race site Air Operations Command;
8. Obtain necessary FAA waivers;
9. Obtain map of race venue;

PRE-FLIGHT CHECK LIST

Preflight inspection is required under Part 107.49; the RPIC is required to develop a preflight inspection checklist if the manufacture has not developed one.

The checklist is usually integrated into the sUAS flight software. In case that is not available, a standard Flight Checklist (Figure 1) should be made and followed by the flight crew. RPIC should utilize the checklist to ensure the highest level of safety. At a minimum, this pre-flight checklist ('APPENDIX B') should contain the following:

- Required documentation, Pilots Certificate, Aircraft Registration, Required FAA Waiver Authorizations, sUAS Flight Manual, Proof of Insurance;
- Weather conditions suitable;
- Check air frame for cracks and check all screws are tight;
- Propeller(s)/Rotor(s) not damaged and tightly fixed;
- Propulsion system mounting(s) secure;
- Batteries fully charged and securely mounted;
- Calibrate all sUAS at each race event;
- Communications (datalink) check;
- Ensure the GPS module (if any) has GPS "fix";
- Check mission flight plan;
- "Return Home" and/or "Emergency Landing" locations are selected, located appropriately, and loaded to the GCS and aircraft;
- Ensure sensors are calibrated and that the right setting is loaded for each aircraft;
- Complete flight crew briefing;
- Ensure the launch site is free of obstacles;
- Recheck wind direction before launch;
- Confirm phone number for nearest Air Traffic Control facility, Air Boss and Event Staff as required in the event of emergency.

INSPECTION

1. Before first flight of each day, verify all batteries are fully charged;
2. Verify flight controllers are fully charged;
3. Calibrate each sUAS upon arrival to each race venue;
4. Check the entire aircraft per the pre-flight inspection instructions in the manual for the specific aircraft to make sure it is in good structural condition and no parts are damaged, loose, or missing;
5. Check propeller(s) or rotor blades for chips, cracks, looseness and any deformation;
6. Check camera(s) and mounting systems are secure and operational;
7. Perform an overall visual check of the aircraft prior to arming any power systems;
8. Repair or replace any part found to be unsuitable to fly during the pre-flight procedures prior to takeoff;

WEATHER

Before each flight the RPIC and Visual Observer should:

1. Ensure that he/she gathers enough information about the existing and anticipated near-term weather conditions throughout the entire mission environment. As a best practice he/she should utilize FAA approved weather resources such as; Meteorological Terminal Aviation Weather Reports (METARS), Terminal Area Forecasts (TAF), etc. to obtain the best information. In order to obtain the latest and most current weather conditions, Notices to Airmen (NOTAMs), and Temporary Flight Restrictions (TFRs) the RPIC should obtain a local aviation briefing at; 1-800-WXBRIEF or www.1800WXBRIEF.com. (SEE EXHIBIT H – EXAMPLE TFR/FLIGHT RESTRICTIONS)
2. Wind direction plays a major factor in flight operations. Operators should take precautions to ensure that wind conditions do not exceed the aircraft limits stated in the aircraft operations manual/specifications. An anemometer (pocket anemometers are available from a variety of sources) is a low-cost and simple to use tool that can be utilized in order to better estimate the wind speed and determine if it is within the necessary limits of the sUAS being flown. Use of an anemometer is highly recommended, in particular in cases where wind conditions and whether they are within limits may be questionable. In general, sUAS operations will continue if the Unlimited Hydroplanes can participate in the race. White caps will generally be a determining factor as to whether the race will run. The sUAS are not water/rain proof therefore will not operate in rain conditions.
3. The RPIC should ensure that the flight will occur within the weather requirements specified in Part 107.51 (c-d), 3 statute miles, the sUAS must be kept at least 500 ft. below a cloud and at least 2,000 ft. horizontally from a cloud. While the FAA can obtain waivers under Part 107 for certain types of operations in particular locations for night-time or beyond line-of-sight operations, the vast majority of authorizations are for FAA VFR conditions and require Visual Line of Sight (VLOS) between the aircraft and the sUAS Operator as well as between the aircraft and the Visual Observer at all times.
4. In the event of rain, alternative devices maybe used for video recording such as 'Go-Pro' cameras or other device at the direction of the Chief Race Official.

DOCUMENTATION

Once the RPIC confirms the location is safe to fly and becomes familiarized with the surroundings, it is recommended that he/she document all the details in a Pre-Flight Report. The Pre-Flight Report can often be filled out prior to arrival at the site as a part of mission planning and then signed off by the RPIC once on site and the RPIC has confirmed that the operation can be conducted safely at the site. Furthermore, it is recommended that such a report be completed for each mission regardless of whether it is completed prior to or after the flight as the report serves as an essential piece of documentation associated with the sUAS operation. An example of what the report should contain is:

1. Altitudes to be flown;
2. Mission overview;
3. Frequencies to be used;
4. Planned flight time;
5. Contingency procedures;
6. Pilot Name;
7. Observer (s) names(s);
8. Date & Time.

INSURANCE REQUIREMENTS

The sUAS Flight Director, with the approval of the Administrative Director, will arrange for sUAS Insurance as required to include:

- H1 Unlimited as Insured;
- RPIC(s) are included in insurance policy;
- All additional insured as required;
- Minimum Insurance of \$2M Liability Coverage;
- Review of Insurance Policy by H1 General Counsel;
- Hull insurance to be determined;

(EXHIBIT E – EXAMPLE INSURANCE POLICY)

ADDITIONAL INSURANCE

Other approved parties utilizing sUAS at any H1 Race events will provide liability insurance as required by APBA and Race site naming H1 Unlimited as additional insured valid for all days of planned flights.

OPERATING REQUIREMENTS

Rules of the sky when operating a drone:

- Always avoid manned aircraft;
- Never operate in a careless or reckless manner;
- Keep your sUAS within visual line of sight (VLOS), have a visual observer;
- You cannot be a pilot or visual observer for more than one sUAS operation at a time;
- Do not fly a sUAS over people;
- Do not operate sUAS from a moving vehicle;

The maximum allowable altitude is 400 feet above the ground, higher if your drone remains within 400 feet of a structure with ATC approval. Maximum speed is 100 mph. If flying under an FAA Waiver, this takes precedent over standard operating requirements. The allowable maximum altitude will be determined by the Airspace Waiver at each race sight and will be reiterated during flight briefings each morning of the race event.

COMMUNICATIONS

FLIGHT CREW COMMUNICATIONS

The knowledge of flight management process flow is crucial for effective communication. It is important for the RPIC(s), VO(s), and other essential flight personnel to maintain communication at all times. During all operations, the RPIC(s), VO(s), and other flight personnel will acknowledge that he/she received a message. This way the flight crew can coordinate flight operations in an organized and effective manner. A proper decision-making structure (communications plan) should be identified prior to Pre-Flight Operations and should be followed by the flight crew at all times, i.e., in-order of the hierarchy from highest to lowest; Flight Director, RPIC, the VO(s) and other flight personnel.

EXTERNAL COMMUNICATIONS

Waiver must be obtained before flight operations are conducted in Class B, C, D, and E airspace. The FAA maintains a website to file waivers. Website: https://www.faa.gov/ssUAS/request_waiver/ Instructions for filling out the waiver are linked to the website link above. Applications with incomplete or incorrect information will be rejected. The RPIC will need to follow the provisions of the waiver which will vary by location.

According to AC 107-2 5.8.1, “Unless the flight is conducted within controlled airspace, no notification or authorization is necessary to operate at or near an airport.” When operating in the vicinity of an airport, the RPIC must be aware of all traffic patterns and approach corridors to runways and landing areas (AC 107-2 5.8.1, 5.8.1.1, 5.8.1.2). Operations in the vicinity of airports in uncontrolled airspace do not require airport operator/management notification. However, adherence to CFR 107.43 “Operations in the vicinity of airports” is required. 107.43 states, “No person may operate a small unmanned aircraft in a manner that interferes with operations and traffic patterns at any airport, heliport, or seaplane base.” As a result, it is important to allow for additional pre-flight planning time to become knowledgeable about the specific non-towered airport operations.

When operating in the vicinity of a non-towered airport within Class G Airspace two-way radio communication with the Common Traffic Advisory Frequency (CTAF) or Unicom is not required under Part 107. Never-the-less, it is recommended that the sUAS flight crew monitor the airport’s CTAF or Unicom, and be familiar with airport operations and radio communication procedures. It is also best practice to have the local emergency responder’s phone number on hand in case of emergencies.

AIR SHOW COORDINATION

For event venue(s) which is producing an Air Show concurrent to boat race, and the Air Show is operating under an FAA FAR Waiver and Authorization, additional requirements exist. The event organizer will designate an FAA qualified Air Boss as part of their application process. The Air Boss maintains complete control of all aircraft operations within the effective times and airspace described within the event Waiver and Authorization.

AIR SHOW INTEROPERABILITY

1. Determine if Air Show has included sUAS operation under their Waiver and Authorization. Typically, one Authorization and Waiver exists for an event site.
2. Coordinate with event Air Show director at least 120 days in advance.
3. sUAS Safety Plan must be provided to Air Show Director or Air Boss 60 days prior to event.
4. RPIC(s) and Flight Director must attend the Air Boss performer and operator briefing on each day of flying.
5. sUAS pilots must maintain radio contact with Air Boss during sUAS operations.
6. No sUAS operations are permitted anytime another aircraft is operating in the Waivered Airspace.
7. Do not launch sUAS aircraft without direct authorization of Air Boss.
8. Any inflight anomalies or emergencies must be immediately reported to the Air Boss.
9. Flights over spectators or members of the public is not permitted. Flights over participants are only permitted when such flights are essential to the operation of the flight. Each flight over participants must be justified and authorized by the Air Boss.
10. The Air Boss may immediately terminate any sUAS flight in the interest of flight safety or air traffic requirements.

FAA INTERFACE

The Flight Director shall be responsible for all interface with the FAA and shall work with the Race Site Management.

The sUAS Flight Director shall:

- Verify the current FAA registration of each drone annually;
- Verify FAA certification of Pilots and support personnel;
- Attend all necessary Pilot Briefings and Emergency Management Operations;
- Will be the sole point of contact for FAA;
- Obtain, manage and verify all required Waivers, TFR, NOTOMs including all supporting documentation;

FLIGHT AREA/PERIMETER MANAGEMENT

The selection of launch and landing sites is based first and foremost on safety. It is the job of the RPIC to ensure that all flight operations are within the FAA-issued airspace authorization parameters and sUAS flight limits. Flight boundaries, including any restrictions imposed by FAA approvals, nearby airport locations, restricted areas, TFRs, etc. should be reviewed prior to commencing flight operations.

In addition, the RPIC should identify the following:

1. **Primary Launch and Landing Zone:** Typically, the primary Launch Zone shall be the same as the Landing Zone but they can be separate locations. The RPIC has final authority for any approaches to the primary zone and elect to reject an approach deemed unsafe;
2. **Alternate Emergency Launch/Landing Zones:** The RPIC shall designate at least one Alternate Emergency Launch/Landing Zone. In the event that a landing is not possible and the primary landing zone is deemed unsafe, procedures to utilize the Alternate Emergency Launch/Landing Zone will be invoked;
3. **Mission Abort Sites:** The RPIC may optionally designate an alternate landing zone whereby the aircraft may be landed indirectly in an emergency situation. The alternate landing zone should be located/designated so as to provide absolute minimal risk if the aircraft as required to vacate airspace in an emergency. If the RPIC deems it necessary, the sUAS may be flown to this site and landed without regard to the risk to the flight equipment or the unmanned aircraft. The safety of persons, manned aircraft, and property should be prioritized over the risk to the sUAS equipment;
4. **Flight over populated areas:** The RPIC should make every effort to select a landing zone that avoids approaches over populated areas;

Landing Safety & Crowd Control: All landing zones should be maintained and operated in the same manner as the launch zones. A buffer of at least 50 feet should be maintained at all times between aircraft operations and all nonessential personnel (all personnel other than the sUAS Operator/RPIC and the Visual Observer).

IN-FLIGHT OPERATIONS

1. Maintain radio communication with Air Boss or designee, if applicable;
2. Flight Director or designated RPIC will communicate and notify the Air Boss throughout the Air Operation for pre- and post-flight operations and any additional requests;
3. Pilots will have H1 Communication radios to receive race activity and deployment of hydroplanes in order to calculate the correct time of launch of sUAS for each race event;
4. Pilots will have Air Comms and monitor at all times;
5. Pilots will launch sUAS upon approval of Air Boss at or before the 5 to the 5 countdowns for each race heat event; 'SEE AIR SHOW COORDINATION'.
6. The RPIC(s) should launch, operate, and recover from preset locations so that the aircraft will fly according to the mission plan;
7. After the sUAS is launched, the flight crew should have a clear view of the aircraft at all times, called Visual Line of Sight (VLOS). Observation locations should be selected for the maximum line of sight throughout the planned flight operations area (Part 107.31);
8. All flight operations must be conducted using a minimum of a RPIC and VO, as outlined in Part 107.33, depending on the complexity of the flight mission to perform general safety, visual observation, hazard and traffic avoidance (Part 107.37);
9. To ensure the flight is going according to the flight plan, the RPIC and VO (if used) must be able to maintain effective communication with each other at all times (Part 107.33);
10. The VO should be informed on what the aircraft is supposed to be doing and the altitude of the aircraft above ground level;
11. Part 107.39 does not permit sUAS flights over persons not directly involved in the operations. Flights taking place over populated areas, heavily trafficked roads, or an open-air assembly of people is not allowed under regulation (unless through waiver). If the mission dictates that flight operations be conducted in such areas, the RPIC will need to obtain a waiver before conducting a flight;
12. The VO should make the RPIC aware of any possible flight hazards immediately during the flight;
13. Upon any failure during the flight or any loss of visual contact with the sUAS, the RPIC should command the aircraft back to the recovery location or utilize the built-in fail-safe features to recover the aircraft. Emergency procedures as defined in the specific sUAS operator's manual should be followed.

POST-FLIGHT OPERATIONS

1. RPIC/VO will scan the landing area for potential obstruction hazards and recheck weather conditions;
2. RPIC/VO will announce aircraft is on final approach and inbound to land;
3. RPIC/VO will always be prepared to reject or abort a take-off or landing, called a “go- around,” if the RPIC becomes aware that such an operation cannot be safely made due to an unexpected weather situation, emergency, hazard or miscalculation;
4. Carefully land the aircraft away from any obstructions and people;

After landing the aircraft, RPIC/VO will:

1. Power down the camera or sensors;
2. Shut down the sUAS and disconnect the batteries;
3. Visually check aircraft for signs of damage and/or excessive wear;
4. Verify that mission objectives have been met;
5. The Flight Director will off load all footage to hard drives. If imagery or other data are recorded onboard the aircraft during flight, transfer the data as necessary to the Ground Control Station (GCS) or a backup storage device. If all data and imagery is transmitted to the GCS and recorded on the GCS during the flight, a backing up of all the data will be performed;
6. Enter log book entries recording flight time and other flight details;
7. In case there are multiple flights to be conducted, repeat checklist steps to prepare the aircraft for launch again;

RACE OFFICIALS

Coordination with H1 Unlimited Chief Referee to establish the optimal location for race officiating and hover locations for each race event. These locations will be established on Race Site Set-up Day after buoys have been put in place on the race course and confirmed prior to each race.

RACE OFFICIAL MEDIA REVIEW

Aerial footage shall be captured on the official Chief Referee monitoring device for review; in the event a review of a race heat is necessary, the Flight Director will prepare the requested footage and make available immediately to the race officials. No footage will be released without the consent of the Chief Race Official and the Flight Director.

REMOTE PILOT SAFETY RULES

Authorized remote pilots must operate the drone in a safe manner, adhering to federal, state and local laws. Remote pilot safety rules include:

- Remote pilots are encouraged to read the owner's manual thoroughly to become familiar with all the features, limitations and recommended maintenance;
- Be courteous and respectful to motorists, bicyclist, pedestrians and property tenants;
- Do not engage in distracting activities while flying the drone, such as talking on a phone, texting, eating or any other activity that takes your attention away from operating the drone;
- Do not operate a drone while attempting to drive a vehicle;
- Do not allow unauthorized individuals to operate the drone on your behalf;
- Do not operate the drone while impaired by alcohol, illegal drugs, medications, illness or fatigue;
- Do not operate the drone in or around natural disasters, emergency responders or related situations;
- Do not operate the drone in an unethical fashion;

IN-FLIGHT SAFETY RULES

- Fly the drone during daylight hours unless a waiver has been obtained before the flight;
- Maintain visual sight of the drone at all times unless a waiver has been obtained before the flight;
- Do not fly the drone higher than 400 feet above ground level unless flown within a 400-foot radius of a structure;
- Maintain a minimum distance of 500 feet below and 2000 feet horizontally of any clouds;
- Maintain a minimum visibility of three statute miles from the control station location;
- Do not fly the drone over crowds of individuals unless a waiver has been obtained before the flight;
- Do not operate the drone from a moving vehicle unless a waiver has been obtained before the flight;
- Do not operate the drone in a careless or reckless manner;
- Store the drone and equipment in a secure, locked location when not in use.

EMERGENCY PROCEDURES

sUAS EMERGENCY PROCEDURES

Emergency procedures are specific to each sUAS type as designed by the manufacturer. It is the responsibility of the flight crew to be proficient with the aircraft operational manual provided by the vendor before any flight operations are conducted. It is also a best and safe practice to prepare an Emergency Checklist (**'APPENDIX B-3'**) in case of emergencies. The RPIC should always be prepared to execute an emergency procedure in instances where there is a lost link, loss of GPS, or if there are other aircraft or obstructions in the flight path. He/she should brief the flight crew before the start of the flight operations about emergency procedures and have a mission abort site for landing in the case of an emergency. After the aircraft has safely landed, it should be documented for maintenance purposes. Some possible emergencies due to system failures are as follows:

1. Loss of Datalink communications;
2. Loss of GPS;
3. Autopilot Software error/failure;
4. Loss of Engine power;
5. Ground Control System failure;
6. Intrusion of another aircraft into the sUAS mission airspace;

This is not meant to be a comprehensive list as the types of failures and associated emergency conditions vary for different sUAS, airspace events, and crew performance. Many sUAS have a number of failsafe options in case of failures or emergency situations. These include using methods of stabilization and an automated Return to Land (RTL) or Return to Home (ROH). Other features include fail-recovery software. The specific failsafe options available for each type of sUAS should be outlined in the sUAS documentation (Operator's Manual, Checklists, etc.). These fail-safe mechanisms should be tested during training and currency flights. Flying without these fail-safe mechanisms in place is not recommended.

An emergency avoidance procedure should be determined before landing. Options are 'Abort and Land' or "Knock-it-Off" indicate land immediately, move to a predetermined location and altitude, or another approach. All possible incursions must be assessed for risk mitigation in advance of flight.

In the event of a lost link or fly away, the RPIC should evaluate the airspace affected and contact the appropriate controlling agency (i.e., Air Boss; control tower, airport manager, etc.) immediately with details of the flight such as; location, direction of flight and approximate altitude, speed and flight time remaining (remaining battery life).

(SEE APPENDIX B2-EMERGENCY PROCEDURE)

In the event that a drone falls into the water, contact the H1 Rescue Crew to see if they are able to retrieve the drone. This is an option in some waters. No drone operations will be conducted directly over moving vessels on the water. Drones that fall into the water are considered lost and, in most cases, irretrievable. Loss of drone only in water is not a reportable case.

In the event of an emergency the RPIC should be prepared to submit a written statement on any deviations upon the request of the Administrator (FAA) as outline in Part 107.21. Best practices suggest that the RPIC fill out a NASA Aviation Safety Reporting System (ASRS), Electronic Report Submission (ERS). More information can be found at:

<https://asrs.arc.nasa.gov/overview/summary.html>.

RACE SITE EMERGENCY PROCEDURES

In the event of a race emergency; all drones will abort mission and land immediately. Only upon authorization from H1, Air Boss, Emergency Management or Incident Manager, will drones remain deployed in efforts to help with the emergency or documentation of the emergency. These procedures will be pre-planned and discussed with Air Boss and Emergency Management Personnel prior to event. These operations will only be conducted if there is no interference with emergency responders or rescue efforts.

ACCIDENT REPORTING

All incidents involving damage to the drone, property of others, personal injury to members or others should be reported immediately to the Flight Director. Ensure that medical attention is provided to any injured parties as quickly as possible. Notify emergency personnel and/or law enforcement in the event of an accident where injuries or property damage occurs. Gather as much information as possible about the incident and document facts using the H1 Unlimited General Liability Report.

In the event of an accident, the remote pilot is required to report any of the following to the FAA within 10 days of the accident (as defined by regulation), per Part 107.9.

FAA defines an accident when:

1. Any person suffers death, serious injury or loss of consciousness;
2. Damage to any property, other than the small sUAS if the cost is greater than \$500 to repair or replace the property, whichever is lower.

The accident report can be submitted FAA Regional Operations Center (ROC) electronically at https://www.faa.gov/ssUAS/report_accident/ or by telephone using the following directory:

SEE 'EXHIBIT A'

The ROC Reports may also be made to the nearest jurisdictional FSDO at https://www.faa.gov/about/office_org/field_offices/fsdo/ The report should include the following information:

1. RPIC's name and contact information;
2. RPIC's FAA airman certification number;
3. sUAS registration number issued to the aircraft, if required (FAA registration number);
4. Location of the accident;
5. Date of the accident;
6. Time of the accident;
7. Person(s) injured and extent of injury, if any or known;
8. Property damaged and extent of damage, if any or known; and
9. Description of what happened.

sUAS accidents are reported to the FAA ROC. However, in some cases, according to FAA AC 107-2 (4.5.2), a sUAS accident must be reported to the National Transportation Safety Board (NTSB). The Advisory Circular (AC) directs the RPIC on reporting an accident to the FAA to consult the NTSB website www.nts.gov for more information. It is important to understand the regulations so that proper reports and notifications can be prepared following an accident. Enforcement action can be taken against the operator if notification is not made within the prescribed timeframe.

REFERENCES

FINAL RULE OF FAA 14 CFR PART 107

- *Federal Aviation Administration – Unmanned Aircraft Systems* <https://www.faa.gov/uas/>
- *FAA Advisory Circular 107 – 2: Small Unmanned Aircraft Systems*
https://www.faa.gov/documentlibrary/media/advisory_circular/ac_107-2.pdf
- *Federal Aviation Administration, Federal Aviation Regulations, CFR 14 Part 107, Small Unmanned Aircraft Systems* <https://www.ecfr.gov/cgi-bin/text-idx?node=pt14.2.107&rgn=div5>
- *Federal Aviation Administration, Part 107, Applying for a Waiver*
https://www.faa.gov/uas/commercial_operators/part_107_waivers/
- *National Transportation Safety Board Part 830, Notification and Reporting of Aircraft Accidents*
https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfr830_main_02.tpl

APPENDIX

APPENDIX A – sUAS INVENTORY

H1 UNLIMITED sUAS INVENTORY (12-26-20)					
AIRCRAFT MODEL	DJI S/N	FAA CERT #	EXPIRATION DATE	GIMBAL SN	DJI CARE (HULL)
MAVIC PRO	08QUE7C10100Y8	FA393HHFAW	4/7/2021		EXPIRED (Hull)
MAVIC PRO	08QCE6T0120UJ2	FA393HLAEL	4/7/2021		EXPIRED (Hull)
	163DG170014DZG	FA3KFMTRH	5/1/2022	OZBDFCV001W3BE	EXPIRED (Hull)
	163DG6P001J3C6	FA3FNKHP79	8/1/2022	OZBDG6R001JN3K	EXPIRED (Hull)
	163CG8ER0A0T8S	FA3R9CMLAM	9/9/2022	OZBDG8DR016PWM	EXPIRED (Hull)

APPENDIX A1 – sUAS BATTERY INVENTORY

H1 UNLIMITED-DJI MAVIC 2 BATTERIES (12-26-2020)						
Battery #	Serial Number	Production Date	Charges	Status	Days to Discharge	Notes:
1	0P2AG4N5340147	2019-4	32	OK	10	
2	0P2AG5653400VE	2019-5	28	OK	10	
3	0P2AG4N5340073	2019-4	26	OK	10	
4	0P2AG4N5340107	2019-4	23	OK	10	
5	0P2AG4N534014J	2019-4	26	OK	10	
6	0P2AFC753400N1	2018-12	33	OK	10	
7	0P2AFB653405Q6	2018-11	37	OK	10	
8	0P2AFB653405XR	2018-11	36	OK	10	
9	0P2AG2U5340DE4	2019-3	26	OK	10	
10	0P2AG8553406DU	2019-7	12	OK	10	
11	0P2AG6553403XA	2019-5	23	OK	10	
12	0P2AG655340441	2019-5	21	OK	10	
13	0P2AG6553403T4	2019-5	26	OK	10	
14	0P2AG6553403SH	2019-5	19	OK	10	
15	0P2AG6K534002T	2019-6	23	OK	10	

MAVIC PRO BATTERIES (2-1-2021)						
1	093XE7504401DQ	2017		OK	10	
2	093XE6H05400LX	2017		OK	10	
3	093AE5T03202RU	2017		OK	10	
4	093AE6T03202S4	2017		OK	10	
5	093AE3803103HQ	2017		OK	10	
6	093AE5603205EE	2017		OK	10	
7	093AE8903201ZR	2017		OK	10	
8	093AE590320FH9	2017		OK	10	
9	093AE5T03202QT	2017		OK	10	
10	093AE5T03201PE	2017		OK	10	

APPENDIX B – PRE-FLIGHT CHECKLIST

<h1>Pre-Flight Checklist</h1>			
Remote Pilot in Command:	FAA Reg. No.:	Date:	
Observer (Optional):	Location:		
sUAS Name & Model:			
Purpose of Flight (Check 1): <input type="checkbox"/> Recreation <input type="checkbox"/> Commercial ⁽¹⁾ <input type="checkbox"/> SAR ⁽²⁾ <input type="checkbox"/>			
Other (Describe):			
Authorization for flight in restricted airspace: (Required for flight in restricted airspace only, otherwise NA)			
Authorized by: _____ Title: _____			
A. Pre-Start Checklist Important: Complete all check list items in the order they are presented. If you cannot check off an item			
No.	Item	Acceptable Condition	Sat.
1	Airspace	Unrestricted airspace or flight authorized	
2	Weather	Potential obstructions near intended flight path	
3	sUAS	Visibility >=3 miles/500 ft., Wind <=15mph, Precip. -	
4	sUAS Battery	No structural defects visible	
5	sUAS Battery	Sufficient for intended flight, not less than 100%	
6	Controller Battery	Sufficient for intended flight, not less than 75%	
7	Memory Card	Installed, sufficient memory space available for	
8	Observer	Present, briefed and ready (Only if designated, otherwise	
9	Camera Gimbal Lock	Removed	
10	Display Device	On	
11	Controller Power	On	
12	sUAS Power	On	
13	Strobe Lighting	Visible or 3NM	
14	sUAS Status Lights	Flashing GREEN	
15	Camera Check	FPV camera view normal	
16	Compass Calibration	Compass calibrated for current location	
17	Flight Limits Set	Alt. <=120 meters, Dist. <=500 meters	
18	Flight Mode Set to	Controller mode switch in "P", display status GREEN	
19	Take-Off Location	Clear for >=25ft. radius, no overhead obstructions	
B. Motor Start Checklist			
No.	Item	Acceptable Condition	Sat
1	sUAS Motor Start	sUAS motors start and run at idle, no abnormal	
2	Home Point	Home Point Set	
3	Hover Check	Flight and Camera Gimbal control responses normal	
4	Flight Telemetry	Telemetry normal (Bat, Alt, Dist., etc.)	
READY FOR FLIGHT			
Notes:			

APPENDIX B1 - POST-FLIGHT CHECKLIST

Landing/Post Flight Check List			
A. Landing Checklist			
No.	Item	Acceptable Condition	Sat
1	Landing Location	Clear for ≥ 25 ft. radius, no overhead obstructions	
B. Post-Flight Checklist			
No.	Item	Acceptable Condition	Sat
1	Camera/Video	Off	
2	sUAS Power	Off	
3	Controller Power	Off	
4	Strobe Lighting	Off	
5	Display Device Power	Off	
6	Camera Gimbal Lock	Installed	
7	Memory Card	Remove for video transfer	
Notes: <div style="height: 100px;"></div>			

APPENDIX B2 - EMERGENCY PROCEDURE

In case of loss of control/flyaway:

- Warn any individuals in vicinity if possible
- Keep visual contact with aircraft as long as possible
- Consider using CSC to stop props, to avoid damage should it hit someone

In case loss of visual contact with aircraft:

- Check if any other individual has a visual of aircraft
- Consider increasing altitude to clear known obstacles
- Focus on the video stream and navigate aircraft home
- Use map/radar to manually fly aircraft home
- Engage Return to Home (RTH)

In case of loss of radio contact with aircraft:

- Focus on visual contact and track the drone to determine its location
- If possible, get others to help as spotters
- Try to realign antennas to regain contact
- Try relocating remote control (RC) to regain contact (move to higher ground or closer to aircraft)
- Wait for RTH to engage with aircraft to return

In case of loss of visual and radio contact with aircraft:

- Try to realign antennas to regain contact
- Try relocating RC to regain contact (move to higher ground or closer to aircraft)
- Wait for RTH to engage and aircraft to return

In case of loss of GPS/aircraft going into ATTI mode:

- Keep visual contact with aircraft and fly home manually
- Focus on the video stream and navigate aircraft home
- Use map/radar to manually fly aircraft home

Recovery situation:

- If aircraft is "lost" in known location, make sure it is safe to attempt recovery.
- Consider getting assistance if location is deemed inaccessible or unsafe.

In case of injury:

- Have a small medical kit available
- Know where the nearest medical facility is located

APPENDIX B3 – H1 RULE 3F - HELICOPTERS & UAS

H1 RACE SITE REQUIREMENT RULE

(REFER TO H1 UNLIMITED RULE BOOK SECTION 3F – HELICOPTERS & UAS)

1. Unless otherwise agreed between H1 Unlimited and the Race Site, the race site shall furnish a minimum of two (2) helicopters, at no charge to H1 Unlimited.
 - a. If one or more helicopters are used, at least one must have at least four (4) seats, for official use only.
 - b. If utilized, the second helicopter must have at least two (2) seats.
2. H1 Unlimited, at H1's option, may elect to substitute one, two or more unmanned aircraft systems (UAS/Drone), provided by H1 Unlimited or a third-party service, for either or both helicopters, but only once such technology has been adequately tested, and approved by the Chief Referee. The cost so such UAS services, including the operation thereof and any insurance therefor, shall be paid by the Race Site or reimbursed by the Race Site to H1 Unlimited, as applicable.
3. Each helicopter or UAS shall be properly registered (if and as required) with the Federal Aviation Administration.
4. Each operator of a helicopter (including its flight crew) or UAS shall be properly licensed and have such certificates as are necessary under the applicable Federal Aviation Regulations (FARs) to conduct these types of operations.
5. The Race Site shall be responsible for (with H1 Unlimited's reasonable assistance) any and all coordination with the local FAA Flight Standards District Office (FSDO) or other applicable FAA office, including Air Traffic Control (ATC), required of the operations of any such helicopter or UAS during the Competition (including Time Trials and Testing) within any controlled airspace and to cause the FAA to authorize such operations pursuant to or as a waiver of any airspace restrictions, including any Notice to Airmen (NOTAM) or Temporary Flight Restrictions (TFRs) issued by the FAA (or Similar regulatory body) in connection with or affecting the Event.

APPENDIX C - COST & EXPENSE SUPPLEMENT

EXHIBITS

EXHIBIT A – FAA REGIONAL OFFICES

Region	Contacts
Great Lakes Region – AGL-7 Office of the Regional Counsel O'Hare Lake Office Center 2300 East Devon Avenue, AGL-7 Des Plaines, IL 60018 847-294-7313 847-294-7498 – FAX	James W. Tegtmeier – Regional Counsel Karen Staten – Management & Program Analyst Yolanda Quiles – Legal Technician
Northeast Region – ANE-7 Eastern Office of the Regional Counsel 1 Aviation Plaza, Room 561 Jamaica, New York 11434-4848 718-553-3285	Mary M. McCarthy – Regional Counsel Jacqueline Facey – Mgmt. & Program Analyst
New England Office of the Regional Counsel 1200 District Avenue Burlington, MA 01803 781-238-7040 781-238-7055 – FAX	Mary M. McCarthy – Regional Counsel Michelle A. Mullarkey – Mgmt. & Program Analyst Lisa A. Melanson – Program Analyst Donna R. Sorensen – Program Analyst
Northwest Mountain Region – ANM-7 Office of the Regional Counsel 2200 S. 216 th Street Des Moines, WA 98198 202-231-2200 206-231-2176 – FAX	Dwight S. Williams – Regional Counsel Dana Stephenson – Mgmt. & Program Analyst Terri E. Kirk – Mgmt. & Program Analyst
Southern Region – ASO-7 Office of the Regional Counsel 1701 Columbia Avenue, Suite 530 College Park, Georgia 30337 404-305-5200 404-305-5223 – FAX	Taneesha D. Marshall – Regional Counsel Gerald A. Jennings – Program Analyst Bernice Fain – Mgmt. & Program Analyst
Southwest Region – ASW-7 Office of the Regional Counsel 6N-300 10101 Hillwood Parkway Dr. Fort Worth, Texas 76177 817-222-5099 817-222-5945/5092 – FAX	Kim Tolar – Regional Counsel Linda O. Scott – Mgmt. & Program Analyst Aileen C. Ayala – Program Analyst Marquitta L. Robinson – Mgmt. & Program Analyst Akia Downes – Legal Assistant
Western Pacific – AWP-7 Office of the Regional Counsel 15000 Aviation Blvd. Room 6007 Lawndale, CA 90261 310-725-7100 310-725-6816 – FAX	Lierre M. Green – Regional Counsel Debra Reed – Mgmt. & Program Analyst Agnes E. Ebilane – Legal Technician

EXHIBIT B - EXAMPLE FLIGHT PLAN



Seattle Seafair sUAS Mission Plan August 2-4, 2019

Date: 4-17-2019

Scope:

Use of sUAS to transmit and record live video in order to officiate hydroplane racing from an altitude of up to 375' AGL. Race officials will use the video footage to review and make decisions of penalties, infractions or other decisions as deemed necessary.

Objective:

Implement the use of sUAS as a cost effective approach to officiate H1 Unlimited Hydroplane Racing at Seattle Seafair in Seattle, WA. on August 2-4, 2019. With the use of sUAS, race officials will use the transmitted video for review of each race in order to access near real time course penalties and technical infractions. The utilization of sUAS will be more time efficient and cost effective approach as a replacement to the more expensive use of manned helicopters.

Pilots:

Each sUAS pilot will hold a 14 CFR Part 107 certificate and have the proper training required to operate all equipment used for this mission. The sUAS pilots will maintain direct radio communications with the Air Boss on the assigned aviation frequency any time the sUAS is in operation. Pilots will monitor radio communications. Pilots will attend pilot safety briefings at each event and have knowledge of rules and regulations. Each aircraft will have a pre-flight check conducted prior to each flight. The aircraft will remain in the visual line-of-sight at all times. Visual observers will be used as an added safety precaution. The sUAS will not launch unless specifically authorized by the Air Boss, and will immediately recover on the instruction of the Air Boss.

Mission:

Three (3) sUAS for each event: One (1) above the outer marker of turn 1, the second (2) above the outer marker of turn 2 and the third (3) positioned to view the start/finish line at the start of the race. Turn 1 & Turn 2 Drones will be at an altitude of 375' AGL. Transit to and from launch/landing pad will be at 200' AGL. Flight times will begin 10 minutes prior to the start of each heat and end 10 minutes after each heat. Each sUAS will transmit live video to a viewing source at a specified location for the Official Race Referees to review and officiate the live race. Transit/Flight path will be from the takeoff/landing pad to the designated hover location. Aerial footage will be collected during transit flight from launch/landing pad to hover location for increased exposure and marketability of this sport.

Setup:

Prior to the event, we will conduct setup and testing of equipment. This will include establishing the location of launch/landing pad, establishing coordinates/altitude for best field of view used as the hovering point location and timing of the flight plan distance. Appropriate coordination with event Air Boss will be established prior to testing equipment.

Emergency/Contingency Procedures:

Abort mission immediately. Return to Home (RTH) and land. The PIC shall abort the flight in the event of unpredicted obstacles or emergencies.

Lost Link/Lost Communications Procedures:

If the UA loses communications or loses its GPS signal, the UA shall return to a pre-determined location within the operating area and land. This failsafe return to home (RTH) procedure is pre-programmed prior to initiation of flight.

EXHIBIT B - EXAMPLE FLIGHT PLAN (continued)

Race Schedule:

sUAS Turn 1 (DJI Mavic Pro)	sUAS Turn 2 (DJI Mavic Pro)	sUAS Start/Finish (DJI Mavic Pro)
Flight Start: 10 min prior to each heat	Flight Start: 10 min prior to heat	Flight Start: 10 min prior to heat
Flight End: 10 min after to each heat	Flight End: 10 min after to heat	Flight End: 10 min after to heat
Altitude: up to 375' AGL	Altitude: up to 375' AGL	Altitude: up to 375' AGL
Hover Location: outer marker - turn 1	Hover Location: outer marker - turn 2	Hover Location: above start/finish line
Landing Pad: To be determined	Landing Pad: To be determined	Landing Pad: To be determined

Prepared by:

Lisa Courneya
253-921-1966
H1 Unlimited Official
FAA Certified sUAS Pilot



EXHIBIT C – EXAMPLE FAA sUAS REGISTRATION

Small UAS Certificate of Registration

Name: Lisa Courneya - **H1 Unlimited**
Manufacturer: DJI **Aircraft: MP-T1**
Model: M1P (**Mavic Pro**)
Serial Number: 08QUE7C10100Y8
Certificate Number: FA393HHFAW
Issued: 04/07/2018 Expires: 04/07/2021



For U.S. citizens, permanent residents, and certain non-citizen U.S. corporations, this document constitutes a Certificate of Registration. For all others, this document represents a recognition of ownership.

For all holders, for all operations other than as a model aircraft under sec. 336 of Pub. L. 112-95, additional safety authority from FAA and economic authority from DOT may be required.

This Small UAS Certificate of Registration is not an authorization to conduct flight operations with an unmanned aircraft. Operations must be conducted in accordance with the applicable FAA requirements. The operator of the aircraft is responsible for knowing and understanding what those requirements are. For more information on flying for non-model purposes, please visit the FAA website at www.faa.gov/uas



**Federal Aviation
Administration**

Small UAS Certificate of Registration

Name: Lisa Courneya - **H1 Unlimited**
Manufacturer: DJI **Aircraft: MP-T2**
Model: M1P (**Mavic Pro**)
Serial Number: 08QCE6T0120UJ2
Certificate Number: FA393HLAEL
Issued: 04/07/2018 Expires: 04/07/2021



For U.S. citizens, permanent residents, and certain non-citizen U.S. corporations, this document constitutes a Certificate of Registration. For all others, this document represents a recognition of ownership.

For all holders, for all operations other than as a model aircraft under sec. 336 of Pub. L. 112-95, additional safety authority from FAA and economic authority from DOT may be required.

This Small UAS Certificate of Registration is not an authorization to conduct flight operations with an unmanned aircraft. Operations must be conducted in accordance with the applicable FAA requirements. The operator of the aircraft is responsible for knowing and understanding what those requirements are. For more information on flying for non-model purposes, please visit the FAA website at www.faa.gov/uas



**Federal Aviation
Administration**

EXHIBIT D - EXAMPLE RACE SITE FLIGHT PLAN MAP

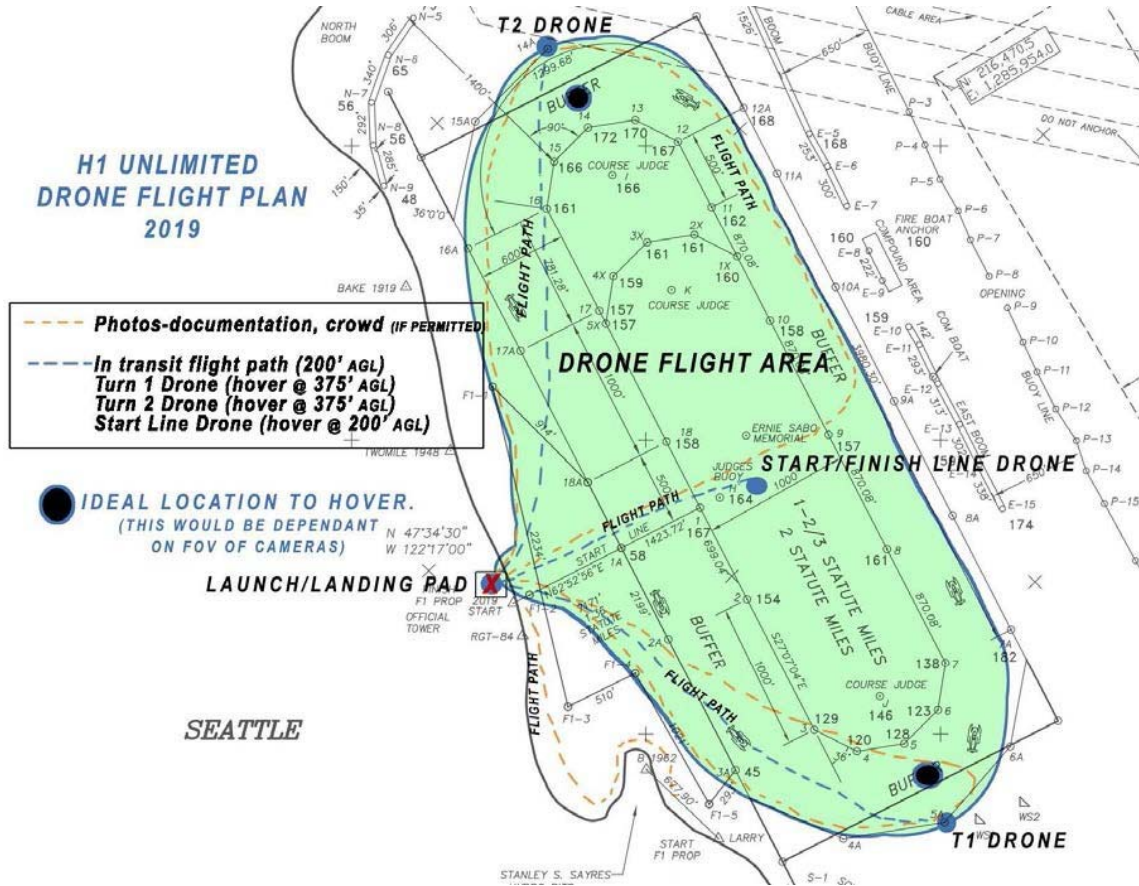


EXHIBIT E – EXAMPLE INSURANCE POLICY



Customer No. 01404903
Certificate No. A-000066636

CERTIFICATE of INSURANCE

This certificate is issued to

APBA
17640 East Nine Mile Road
Eastpoint, MI 48021

On behalf of Named Insured H1 Unlimited
6440 S 144th St
Tukwila, WA 98168

Insurer Global Drone

Issuing Insurer Policy No. 9011013

Policy Period June 15, 2018 to June 15, 2019

Insured Aircraft	Coverage	Limits of Liability
2018 DJI Mavic 2 Pro - FA3KFMTRH - 163G170014D2G, NUAUV Serial No.:	Single Limit Bodily Injury & Property Damage Liability	\$2,000,000 each occurrence

Additional Coverages or Agreements

1. The Certificate Holder is included as an Additional Insured with respect to operations of the Named Insured.

This certificate is issued for information purposes only. It certifies that the policies listed in this document have been issued to the Named Insured. It does not grant any rights to any party nor can it be used, in any way, to modify coverage provided by such policies. Alteration of this certificate does not change the terms, exclusions or conditions of such policies. Coverage is subject to the provisions of the policies, including any exclusions or conditions, regardless of the provisions of any other contract, such as between the Certificate Holder and the Named Insured. Notice is hereby given that AOPA Insurance Agency is not the Insurer hereunder and shall not be held liable for any loss or damage. Should any of the above described policies be cancelled before the expiration date thereof, the Issuing Insurer will endeavor to provide thirty (30) days advance notice to the Certificate Holder, but failure to do so shall impose no obligation or liability of any kind upon the Insurer, its agents or representatives.

Date of Issue: May 30, 2019

By:

Authorized Representative

CERT AL-AL-COI-D
RG

ASSUREDPARTNERS AEROSPACE
OFFICE 411 AVIATION WAY, FREDERICK, MD 21701
MAIL P.O. BOX 578, FREDERICK, MD 21705
P 800-622 AOPA (2672)
www.ap-aerospace.com

CONFIDENTIAL

0 CERT-AL-AL-COI-0

2018-06-542111

01404903

EXHIBIT E – EXAMPLE INSURANCE POLICY (continued)



STRATEGIC
PARTNER

Customer No. 01404903
Certificate No. A-000068265

CERTIFICATE of INSURANCE

This certificate is issued to

City of Seattle
C/O Special Events Commission
700 5th Avenue, Suite 5752
Seattle, WA 98104

On behalf of Named Insured H1 Unlimited
PO Box 1025
Kent, WA 98035

Insurer Global Drone

Issuing Insurer Policy No. 9011013

Policy Period June 15, 2019 to June 15, 2020

Insured Aircraft	Coverage	Limits of Liability
2018 DJI Mavic 2 Pro - FA3KFMTRRH - 163G170014D2G, NUAV Serial No.:	Single Limit Bodily Injury & Property Damage Liability	\$2,000,000 each occurrence

Additional Coverages or Agreements

1. The Certificate Holder is included as an Additional Insured with respect to operations of the Named Insured.

This certificate is issued for information purposes only. It certifies that the policies listed in this document have been issued to the Named Insured. It does not grant any rights to any party nor can it be used, in any way, to modify coverage provided by such policies. Alteration of this certificate does not change the terms, exclusions or conditions of such policies. Coverage is subject to the provisions of the policies, including any exclusions or conditions, regardless of the provisions of any other contract, such as between the Certificate Holder and the Named Insured. Notice is hereby given that AOPA Insurance Agency is not the Insurer hereunder and shall not be held liable for any loss or damage. Should any of the above described policies be cancelled before the expiration date thereof, the Issuing Insurer will endeavor to provide thirty (30) days advance notice to the Certificate Holder, but failure to do so shall impose no obligation or liability of any kind upon the Insurer, its agents or representatives.

Date of Issue: July 12, 2019

By:

Authorized Representative

CERT AL-AL-COI-0
RG

ASSURED PARTNERS AEROSPACE
OFFICE 411 AVIATION WAY, FREDERICK, MD 21701
MAIL P.O. BOX 578, FREDERICK, MD 21705
P 800-622 AOPA (2672)
www.ap-aerospace.com

CONFIDENTIAL

0 CERT-AL-AL-COI-0

2019-03-599388

01404903

EXHIBIT E – EXAMPLE INSURANCE POLICY (continued)



STRATEGIC
PARTNER

Customer No. 01404903
Certificate No. A-000068266

CERTIFICATE of INSURANCE

This certificate is issued to

Seafair
2200 Sixth Avenue, Suite 400
Seattle, WA 98121

On behalf of Named Insured H1 Unlimited
PO Box 1025
Kent, WA 98035

Insurer Global Drone

Issuing Insurer Policy No. 9011013

Policy Period June 15, 2019 to June 15, 2020

Insured Aircraft	Coverage	Limits of Liability
2018 DJI Mavic 2 Pro - FA3KFMTRH - 163G170014D2G, NUAUV Serial No.:	Single Limit Bodily Injury & Property Damage Liability	\$2,000,000 each occurrence

Additional Coverages or Agreements

1. The Certificate Holder is included as an Additional Insured with respect to operations of the Named Insured.

This certificate is issued for information purposes only. It certifies that the policies listed in this document have been issued to the Named Insured. It does not grant any rights to any party nor can it be used, in any way, to modify coverage provided by such policies. Alteration of this certificate does not change the terms, exclusions or conditions of such policies. Coverage is subject to the provisions of the policies, including any exclusions or conditions, regardless of the provisions of any other contract, such as between the Certificate Holder and the Named Insured. Notice is hereby given that AOPA Insurance Agency is not the Insurer hereunder and shall not be held liable for any loss or damage. Should any of the above described policies be cancelled before the expiration date thereof, the Issuing Insurer will endeavor to provide thirty (30) days advance notice to the Certificate Holder, but failure to do so shall impose no obligation or liability of any kind upon the Insurer, its agents or representatives.

Date of Issue: July 12, 2019

By: 

Authorized Representative

CERT AL-AL-COI-0
RG

ASSUREDPARTNERS AEROSPACE
OFFICE 411 AVIATION WAY, FREDERICK, MD 21701
MAIL P.O. BOX 578, FREDERICK, MD 21705
P 800-622 AOPA (2672)
www.ap-aerospace.com

CONFIDENTIAL

0 CERT-AL-AL-COI-0

2019-03-599388

01404903

EXHIBIT F – EXAMPLE NAV-AID

2/5/2021

AirNav: KSEA - Seattle-Tacoma International Airport

AIRNAV.COM



Airports NavAids Airspace Fixes Aviation Fuel Hotels

iPhone App My AirNav

1303 users online

KSEA Seattle-Tacoma International Airport
Seattle, Washington, USA



GOING TO SEATTLE?

5 COUNTRY
Reserve a Hotel Room
Hertz
Rent a Car

FAA INFORMATION EFFECTIVE 28 JANUARY 2021

Location

FAA Identifier: SEA
Lat/Long: 47-26-59.6000N 122-18-42.4000W
47-26.993333N 122-18.706667W
47.4498889, -122.3117778
(estimated)
Elevation: 432.3 ft. / 131.8 m (surveyed)
Variation: 16E (2020)
From city: 10 miles S of SEATTLE, WA
Time zone: UTC -8 (UTC -7 during Daylight Saving Time)
Zip code: 98188



Road maps at: [MapQuest](#) [Bing](#) [Google](#)

Airport Operations

Airport use: Open to the public
Activation date: 01/1944
Control tower: yes
ARTCC: SEATTLE CENTER
FSS: SEATTLE FLIGHT SERVICE STATION
NOTAMs facility: SEA (NOTAM-D service available)
Attendance: CONTINUOUS
Wind indicator: lighted
Segmented circle: no
Lights: SS-SR
Beacon: white-green (lighted land airport)
Operates sunset to sunrise.
Landing fee: yes
Fire and rescue: ARFF index E
International operations: customs landing rights airport

Aerial photo

WARNING: Photo may not be current or correct



Photo by Ron Young
Photo taken 22-Apr-2011
looking north.

Do you have a better or more recent aerial photo of Seattle-Tacoma International Airport that you would like to share?
If so, please [upload it your photo](#)

Airport Communications

UNICOM: 122.95
WX ASOS: 127.75 (206-214-2592)
SEATTLE GROUND: 121.7
SEATTLE TOWER: 119.9 ;RWY 16L/34R, 16C/34C 120.95 ;RWY 16R/34L 239.3 ;RWY 16L/34R, 16C/34C 239.3 ;RWY 16R/34L
SEATTLE APPROACH: 120.1 ;199-300 120.4 ;301-340 RWY 34 125.6 ;ARR WEST 125.9 ;076-160 RWY 34 125.9 ;301-340 RWY 16 126.5 ;161-198 133.65 ;RWY 16/34 123.9
SEATTLE DEPARTURE: 120.1 ;199-300 120.4 ;301-340 RWY 34 125.6 ;ARR WEST 125.9 ;076-160 RWY 34 125.9 ;301-340 RWY 16 126.5 ;161-198 123.9
CLEARANCE DELIVERY: 128.0
ATOME DP: 120.4
CHINS STAR: 123.9
CLASS B: 119.2 ;076-160 RWY 16 119.2 ;341-075 120.1 ;199-300 120.4

Sectional chart



Airport diagram

<https://www.airnav.com/airport/KSEA>

1/6

EXHIBIT H - EXAMPLE TFR/FLIGHT RESTRICTIONS

2/6/2021 Federal Aviation Administration - Graphic TFR's

FAA.gov Home

[TFR List](#)
[TFR Map](#)
[Map Airports](#)
[TFR Help](#)
[NOTAM SEARCH](#)
[SUA](#)

Center: GO State: GO Type: GO SUN, 7 FEB 2021 4:22 UTC


Reset Filter

Click column headings to sort data.

Date	NOTAM	Facility	State	Type	Description
10/08/2020	0/0230	FDC	USA	SECURITY	Special Notice, USA
10/08/2020	0/0229	FDC	USA	SECURITY	USA, Thursday, October 29, 2020 through Friday, October 29, 2021 UTC
08/29/2020	0/9801	FDC	USA	SECURITY	USA, Tuesday, September 08, 2020 UTC
08/20/2020	0/5116	FDC	USA	SECURITY	USA, Tuesday, September 01, 2020 through Wednesday, September 01, 2021 UTC
05/13/2020	0/0852	FDC	USA	SECURITY	USA, Wednesday, May 20, 2020 through Thursday, May 20, 2021 UTC
01/02/2020	0/0367	FDC	USA	SECURITY	USA, Wednesday, January 15, 2020 UTC


This site is informational in nature and is designed to assist pilots and aircrews for flight planning and familiarization. It may be used in conjunction with other pre-flight information sources needed to satisfy all the requirements of 14 CFR 91.103 and is not to be considered as a sole source of information to meet all pre-flight action. Due to system processing delays, recently entered notams may not be displayed.

Total Records: 6



U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591
1-866-TELL-FAA (1-866-835-5322)

Readers & Viewers



Web Policies

[Web Policies & Notices](#)
[Privacy Policy](#)
[Accessibility](#)

Government Sites

[Transportation.gov](#)
[USA.gov](#)
[Plainlanguage.gov](#)
[Regulations.gov](#)
[Data.gov](#)

Contact Us

Customer Support:
 1-866-466-1336
Email: 7-AWA-NAIMES@faa.gov

<https://tfr.faa.gov/tfr2/list.jsp>

1/1