



U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

May 22, 2015

Exemption No. 11660
Regulatory Docket No. FAA-2015-0540

Mr. Mike Lloyd
Lloyd & Associates
2138 Curtis Drive
Vista, CA 92084

Dear Mr. Lloyd:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated February 19, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Lloyd & Associates (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial imaging for safety, monitoring, inspecting and/or recording of secured and controlled environment construction sites, proposed development sites, inspections of property, and photography for realty advertisements.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Phantom 2.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria

provided in Section 333 of Public Law 112–95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraesus Aerial (*see* Docket No. FAA–2014–0352), 11109 to Clayco, Inc. (*see* Docket No. FAA–2014–0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA–2014–0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA–2014–0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Lloyd & Associates is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Lloyd & Associates is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.
2. Operations for the purpose of closed-set motion picture and television filming are not permitted.
3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.
4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.
5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.
6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.
7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The

operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS-80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.
9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.
10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.
11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.
12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.
13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal Government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.
14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs

(training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.
16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.
17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.
18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.
19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.
20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least 5 minutes or with the reserve power recommended by the manufacturer if greater.
21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.
22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.
24. The UA must remain clear and give way to all manned aviation operations and activities at all times.
25. The UAS may not be operated by the PIC from any moving device or vehicle.
26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
 - a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
 - b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.
28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.nts.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
- a. Dates and times for all flights;
 - b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
 - c. Name and phone number of the person responsible for the on-scene operation of the UAS;
 - d. Make, model, and serial or N-Number of UAS to be used;
 - e. Name and certificate number of UAS PICs involved in the aerial filming;
 - f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
 - g. Signature of exemption holder or representative; and
 - h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.
31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/

John S. Duncan
Director, Flight Standards Service

Enclosures

Federal Aviation Administration Exemption

Petition for Exemption under Section 333

FAA Modernization and Reform Act of 2012

Public 112-95 Feb. 14, 2012, Section 333

Submitted by: Lloyd & Associates

Mike Lloyd

Date: 2/19/2015

Dear Sir or Madam:

Attached please find Lloyd & Associates request for an exemption from the listed Federal Aviation Regulations to allow commercial operation of its Small Unmanned Aircraft Systems ("UAS") for aerial imaging for safety, monitoring, inspecting and/or recording of secured and controlled environment construction sites, proposed development sites, inspections of property and photography for realty advertisements. This exemption request is exclusively for the use of the UAS manufactured by DJI, DJI Phantom 2.

Also please find the link to the DJI Phantom 2 UAS Manual ("Manual"), which outlines the operating requirements, limitations, and technical specifications for the DJI Phantom 2 system. <http://www.dji.com/product/phantom-2/download> We have reviewed this Manual and in conjunction with the requirements outlined in this document we have found it to be acceptable for UAS operations on our project sites.

Thank you for your time and consideration, and please let me know if you have any questions.

Sincerely,

Mike Lloyd
Lloyd & Associates

Table of Contents

Contact Information	3
Lloyd & Associates	3
Exemption Applicant	3
Mission Statement	4
Intended UAS Use	5
Specific Section of 14 CFR	6-12
Intended Equipment for Exemption	13
Aircraft Specifications	14
Aircraft Maintenance	15
Safety Concerns	16
Potential Hazards	17
Insurance Policy	18
Privacy Concerns	19-20
Operational Conditions	21
Pilot Qualifications	22
Pre-Flight Checklist	23
Active Flight Operations	23
Additional Resources	24
Exhibit A	25
Exhibit B	26
Exhibit C	27

Contact Information

Exemption Applicant

Lloyd & Associates General Contracting & Design
(Lloyd & Associates)

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Lloyd & Associates General Contracting & Design

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Mission Statement

To exercise, and continue to exercise, operational control of a light weight UAS in order to record video and capture pictures of primarily real estate and properties for the purpose of enhanced public commercial service, worker safety, cost of services efficiency, investigative proficiency and accuracy.

Intended UAS Use

To record video and capture pictures of client's homes/properties for the use in real estate marketing materials, property development, property investigation and documentation by the use of light weight UASs in the following areas of commerce :

- Realty - Selling properties, enhancing advertising campaigns, and increasing production of marketing materials. Evaluating property value by documenting assets and deficits especially in hard to access areas as an alternate to conventional large, heavy, combustible fuel bearing and manned vehicles are currently used.
- Property inspections - Especially roofing inspections, especially tile roofs, are susceptible to added damage from an investigator walking on the roof to complete his initial inspection. A UAS could do the work and record the inspection findings without the probability of additional roof damage or personnel injury from falls. This service would be valuable to companies like: Roofing contractors, Insurance adjusters, property owners, renters, etc.
- Construction defect investigations - Site investigation and findings specifically for building exteriors would be greatly enhanced by the use of a UAS. It can be very expensive to safely find and document exterior construction defects on multiple story building, a UAS could inspect, find and record information that would be otherwise only be accessible by ladders or scaffolding. Also A UAS would be a much safer way to do this type of high and/or difficult access investigation.
- Site investigation - Such as steep hillside or bluff. Recording the visual condition of existing hillsides or bluffs that would otherwise be very difficult to access and record. It would also be less intrusive to environmentally sensitive areas.
- Site development - Creating high resolution scalable overhead photography of a property would be valuable to engineers, architects, designers and landscape architects in evaluating the best use for developing a property and the potential effects that such development might have. Development of existing properties for remodeling or renovation especially commercial building where equipment is located on the roof would also benefit from HD photos that document the equipment and its location. Currently Google Maps are useful for such endeavors but only with a very low resolution overhead photo of such properties.
- Developers and Construction Companies - To record and document the overall progress of large developments and to observe and document job site safety.
- Landscape maintenance - To record landscape health and irrigation proficiency on large properties such as condominiums, apartment complexes, malls, golf courses or even public parks and recreation areas.
- There are many other areas that a UAS would be a safer, accurate and less expensive alternative to current commercial services but Lloyd & Associates would be specifically interested in the areas mentioned above.

Specific Section of 14 CFR

Seeking specific exemption from:

Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 C.F.R. 45.23(b); 14 CFR Part 21; 14 CFR 61.113 (a) & (b); 91.7 (a); 91.9 (b) (2); 91.103(b); 91.109; 91.119; 91.121; 91.151(a); 91.203(a) & (b); 91.405 (a); 91.407(a) (1); 91.409 (a) (2); 91.417 (a) & (b).

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. Part 11, Lloyd & Associates, a design/build and construction firm, hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its Small Unmanned Aircraft Systems ("UAS") for aerial imaging for safety and monitoring of secured and controlled environment construction sites, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.

As detailed in this document and the link to Flight Manual, the requested exemption would permit the operation of UAS under controlled conditions in airspace that is 1) limited 2) predetermined 3) controlled as to access and 4) would provide safety enhancements to the already best practices safety protocols followed by Lloyd & Associates at each one of its project sites. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation's (the FAA Administrator's) responsibilities to "...establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333(c) of the Reform Act.

The name and address of the applicant is:

Lloyd & Associates General Contracting & Design
Mike Lloyd
PH: 760-631-4457
[Email: MikeLloyd@cox.net](mailto:MikeLloyd@cox.net)
Address: 2138 Curtis Dr, Vista CA 92084

Regulations from which the exemption is requested:

14 C.F.R. Part 21
14 C.F.R. 45.23(b)
14 C.F.R. 61.113 (a) & (b)
14 C.F.R. 91.7 (a)
14 C.F.R. 91.9 (b) (2)
14 C.F.R. 91.103
14 C.F.R. 91.109
14 C.F.R. 91.119
14 C.F.R. 91.121
14 C.F.R. 91.151 (a)
14 C.F.R. 91.203 (a) & (b)

I. STATUTORY AUTHORITY FOR EXEMPTIONS

The Federal Aviation Act expressly grants the FAA authority to issue exemptions. This statutory authority includes exempting civil aircraft, as the term is defined under §40101 of the Act, including UAS, from the requirement that all civil aircraft must have a current airworthiness certificate.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest. 49 U.S.C. §44701 (f) See also 49 USC §44711(a); 49 USC §44704; 14 CFR §91.203(a)(1).

Section 333(b) of the Reform Act assists the Secretary in determining whether UAS may operate in the National Airspace System (NAS) without creating a hazard to the user, the public, or a threat to national security. In making this determination, the Secretary must consider:

- The UAS's size, weight, speed, and operational capability;
- Whether the UAS operates within the visual line of sight of the operator
- Whether the UAS operates outside of highly populated areas and away from close proximity to airports

Reform Act §333(a). If the Secretary determines that a UAS "may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system." *Id.* §333(c).

Lloyd & Associates' UASs are multirotor vehicles, weighting 10 or fewer lbs. including payload. They operate under normal conditions at a speed of no more than 50 knots and have the capability to hover, and move in the vertical and horizontal plane simultaneously. The UAS will operate only in the pilot's visual line of sight at all times and will operate only within the recommendations described in the DJI Flight Manual. Such operations will insure that the UAS will "not create a hazard to users of the national airspace system or the public." Reform Act Section 333 (b).

Given the small size of the UAS involved and the restricted and sterile environment within which they will operate, our application falls squarely within the zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UAS to commence immediately.

Also due to the small size of the UASs and the low altitudes and restricted areas in which our UAS will operate, approval of the application presents no national security issue.

Given the clear direction in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, the grant of the requested exemptions is in the public interest. Accordingly, Lloyd & Associates respectfully requests that the FAA grant the requested exemption without delay.

II. PUBLIC INTEREST

This exemption application is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act. By granting an exemption the FAA will fulfill Congress's intent of allowing UAS to operate with significant safety precautions in low risk environments.

The use of UAS on a construction or inspection site can significantly reduce the risk to workers of falls while inspecting, surveying, or monitoring site progress. UAS can inspect, photograph, and collect data on hard to get to areas that otherwise would require worker inspection. Falls are the leading source of workplace fatality and injury on construction sites', and reducing falls through UAS use for site imaging could save workers lives.

Additionally, UAS could replace the use of helicopters and small aircraft to monitor sites. The UAS we propose to fly in this application are under five pounds, and carry no combustible material on board, as opposed to the much larger conventionally powered small aircraft. Shifting to UAS from helicopters presents a marked safety increase for our workers and the public.

Lastly, UAS reduce the environmental impact by dramatically decreasing the energy used for aerial imaging and data collection over a construction site. Our UAS use rechargeable lithium ion batteries, as opposed to fossil fuels burned in operation of small aircraft that are many hundreds of times heavier.

III. EQUIVALENT LEVEL OF SAFETY

Lloyd & Associates proposes that the exemption requested herein apply to civil aircraft that have the characteristics and that operate with the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety

1 "Commonly Used Statistics", Occupational Safety & Health Administration.

Available at: <https://www.osha.gov/oshstats/commonstats.html>

enhancement to the already safe protocols followed on construction sites and imaging and surveying operations conducted with helicopters and other conventional aircraft.

Lloyd & Associates will be bound by the following limitations when conducting its UAS operations under an FAA issued exemption:

1. The UAS will be less than 10 pounds.
2. Flights will be operated within visual line of sight of a pilot.
3. Maximum total flight time for each operational flight will be 30 minutes. The UAS calculates battery reserve in real time, and will return to its ground station with at least 20% battery power reserve should that occur prior to the 30 minute limit.
4. Flights will be operated at an altitude of 200 feet AGL, never exceeding 400 feet AGL.
5. Crew for each operation will consist of the UAS pilot who will keep the UAS within his visual line of sight at all times and a spotter.
6. The UAS pilot will be trained in flight, operations, and safety procedures as detailed in this document and as detailed in the DJI Manual.
7. The UAS will only operate within a confined areas as defined in this document. This document and the DJI Manual also requires the establishment of a Security Perimeter for the flight operations area.
8. A briefing will be conducted in regard to the planned UAS operations prior to each day's production activities. It will be mandatory that all personnel who will be performing duties within the boundaries of the safety perimeter be present for this briefing.
9. All onsite personnel will consent to the UAS flyover on site by waiver, and the operator will obtain additional verbal or written consent of all persons who will be allowed within 100 feet of the flight operation.
10. The pilot will have been trained in operation of UAS generally and received up-to-date information on the particular UAS to be operated as required by this document.
11. Written and/or oral permission from the relevant property holders will be obtained.
12. All required permissions and permits will be obtained from territorial, state, county or city jurisdictions, including local law enforcement, fire, or other appropriate governmental agencies.
13. If the UAS loses communications or loses its GPS signal, it will have capability to return to a pre-determined location within the Security Perimeter and land.

IV. DESCRIPTION OF SPECIFIC REGULATIONS

14 CFR Part 21, Subpart H: Airworthiness Certificates 14 C.F.R. §91203(a)(1)

Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR §91.203 (a) (1). Given the size and limited operating area associated with the aircraft to be utilized by Lloyd & Associates, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act (49 U.S.C.44701 (f)) and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular UAS. Our small UAS will be operated at low speed in a controlled environment, at least five miles from an airport and more than three miles from any city or densely populated area.

An analysis of these criteria demonstrates that the UAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or helicopter) operating with an airworthiness certificate without the restrictions and conditions proposed.

The UAS to be operated hereunder is less than 10 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area as set out in this document and the DJI manual . Like other civil aircraft, operations under this exemption will be tightly controlled and monitored by the operator, pursuant to this document and the DJI Manual's requirements, and under the requirements and in compliance with local public safety requirements, to provide security for the area of operation as is currently done on active construction sites.

These safety enhancements, which already apply to civil aircraft operated in connection with construction sites, provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and ability to carry an external load no greater than two lbs.

14 C.F.R. 45.23(b): Marking of the Aircraft

This regulation requires certain experimental, provisionally certificated aircraft, or light-sport category aircraft to be marked with letters between 2 inches and 6 inches high "limited," "restricted," "light-sport," "experimental," or "provisional," near each entrance to a cabin, cockpit, or pilot station.

Even though the UAS will have no airworthiness certificate, an exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the UAS, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with §45.29(f).

The equivalent level of safety will be provided by having the UAS marked on its fuselage as required by §45.29(f) where the pilot, observer and others working with the UAS will see the identification of the UAS as "Experimental." The FAA has issued the following exemptions to this regulation: Exemptions Nos. 10700, 8738, 10167 and 10167A.

14 CFR 61.113 (a) & (b): Private pilot privileges and limitations: Pilot in command

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. Because the UAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the pilot operating the aircraft to have completed a UAS flight training course of 10 hours before flying a UAS. Unlike a conventional aircraft that carries the pilot and passengers, the UAS is remotely controlled with no living thing or cargo on board. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth in this document. The risks associated with the operation of the UAS are so diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of the UAS as requested with a pilot who has met the minimum requirements of this document exceeds the present level of safety achieved by 14 C.F.R. §61.113 (a) & (b).

14 C.F.R. 91.7 (a): Civil aircraft airworthiness

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft and the requirements contained in the DJI Manual for maintenance and use of safety checklists prior to each flight, as set forth in this document, an equivalent level of safety will be provided.

14 CFR 91.9 (b)(2): Civil aircraft flight manual, marking, and placard requirements

The UAS, given its size and configuration has no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot on board, but because there is no room or capacity to carry such an item on the aircraft.

The equivalent level of safety will be maintained by keeping the flight manual at the ground control

point where the pilot flying the UAS will have immediate access to it. The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

14 C.F.R. 91.103: Preflight Action

This regulation requires each pilot in command take certain actions before flight to ensure the safety of flight. An exemption is needed from this requirement as the pilot will take separate preflight actions, including checking for weather conditions, checking flight battery requirements, checking takeoff and landing distances, and all other actions in the Preflight Checklist in this document and the DJI Manual. These actions will provide an equivalent level of safety.

14 C.F.R. 91.109: Flight Instruction

Section 91.103 provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. By design, UAS and remotely piloted aircraft do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has previously approved exemptions for aircraft without fully functional dual controls. See Exemption Nos. 5778K & 9862A. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft, the ability to control the UAS via radio signals from the controller, and by the size and speed of the aircraft.

14 C.F. R. 91.119: Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. This exemption is for a multirotor craft that flies similarly to a helicopter, with vertical take off and vertical landing, which will typically operate at altitudes of 200 AGL, so an exemption may be needed to allow such operations. The UAS will never operate at altitude higher than 400 AGL and will be in a restricted area with security perimeter, where buildings and people will not be exposed to operations without their pre-obtained consent.

The equivalent level of safety will be achieved given the size, weight, speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of the property owner or local officials. Because of the advance notice to the property owner and any onsite personnel as outlined in the Manual, all affected individuals will be aware of the planned flight operations. Compared to flight operations with aircraft or rotorcraft weighting far more than the maximum 10 lbs. proposed herein and carrying flammable fuel, any risk associated with our operations is far less than those presently presented with helicopters and other conventional aircraft operating at or below 500 AGL in the construction industry. In addition, the low-altitude operations of the UAS will ensure separation between these small- UAS operations and the operations of conventional aircraft that must comply with Section 91.119.

14 C.F.R. 91.121: Altimeter Settings

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "...to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the UAS may not have a barometric altimeter, but instead a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator, pursuant to the Manual and Safety Check list, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

14 CFR 91.151 (a): Fuel requirements for flight in VFR conditions

Section 91.151 (a) outlines fuel requirements for beginning a flight in VFR conditions. Our UAS is limited to operations in sterile and controlled environments as outlined in the Manual, and has a limited range and flight time which require an exemption from 14 CFR 91.151(a).

The battery powering the UAS provides approximately 25 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, UAS flights would be limited to 0 minutes in length. Given the limitations on the UAS's proposed flight area and the location of its proposed operations within a

predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable. Lloyd & Associates believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151(a)). Operating the small UAS, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting UAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted.

An equivalent level of safety can be achieved by limiting flights to 25 minutes, or enough battery reserve to ensure that the UAS lands at the ground station with at least 20% of battery power (as determined by the onboard monitoring system and the pilot), whichever happens first. This restriction would be more than adequate to return the UAS to its planned landing zone from anywhere in its limited operating area. Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

14 CFR 91.203 (a) & (b): Carrying civil aircraft certification and registration The regulation provides in part:

(a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:

(1) An appropriate and current airworthiness certificate....

(b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

The UAS fully loaded weighs no more than 10 lbs and is operated without an onboard pilot. Therefore there is no ability or place to carry certification and registration documents or to display them on the UAS.

An equivalent level of safety will be achieved by keeping these documents at the ground flight control point where the pilot flying the UAS will have immediate access to them, to the extent they are applicable to the UAS. The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

14 CFR 91.405(a); 407 (a)(1); 409 (a)(2); 417 (a) & (b): Maintenance inspections

These regulations require that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter..." and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to Lloyd & Associates. Maintenance will be accomplished by the operator pursuant to the flight manual and operating handbook as referenced in this Document and the DJI Manual. An equivalent level of safety will be achieved because these small UASs are very limited in size and will carry a small payload and operate only in restricted areas for limited periods of time. If mechanical issues arise the UAS can land immediately and will be operating from no higher than 400 feet AGL. As provided in the DJI Manual and this document, the operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

Applicant seeks an exemption from the following rules: 14 C.F.R. §21, subpart H; 14 C.F.R. 45.23(b); 14

C.F.R. § 61.113(a) & (b); 91.7

(a); 91.9 (b) (2); 91.103(b); 91.109; 91.119; 91.121; 91.151(a); 91.203(a) and (b); 91.405 (a);

91.407 (a) (1); 91.409 (a) (2); 91.409 (a) (2) and 91.417 (a) & (b) to operate commercially a small unmanned vehicle (551bs or less) in construction operations.

Approval of exemptions allowing commercial operations of UASs in the construction industry enhances safety while reducing risk. Manned aircraft monitoring and surveying creates a greater risk because the craft are much larger, have combustible fuel, and carry an onboard human pilot. In contrast, a UAS weighing fewer than 10 lbs. and powered by batteries eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The UAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operation of small UASs, weighting less than 10 lbs., conducted in the strict conditions outlined above, will provide an equivalent level of safety supporting the grant of the exemptions requested herein, including exempting the applicant from the requirements of Part 21 and allowing commercial operations. These lightweight aircraft operate at slow speeds, close to the ground, and in a controlled environment and, as a result, are far safer than conventional operations conducted with turbine helicopters operating in close proximity to the ground and people.

Intended Equipment for Exemption

Aircraft: DJI Phantom 2 v2 with H3-3D Gimbal and GoPro Camera

Radio Frequency: 2.4GHz ISM Radio Sensitivity: -97dBm

Manufactures Website: <http://www.dji.com/>

Cameras: GoPro Hero, GoPro Hero 2, GoPro Hero 3+, and GoPro Hero 4

Manufactures Website: <http://gopro.com/>



Aircraft Performance

- Altitude: 1640 ft. (500m)
- Operational Range: 3,280 ft. (1,000m)
- Hover Accuracy: (Ready to Fly) Vertical: 0.8m; Horizontal: 2.5m
- Precision Flight and Stable Hovering
- Flight Time: 25 Minutes
- Battery Life

Quadcopter: 25 Minutes

Remote Control: Over 2 Hours of Continuous Use

- Weight (Battery & Propellers included): 1000g
- Max Yaw Angular Velocity: 200/s
- Max Tilt Angle: 35°
- Max Ascent Speed: 6m/s
- Max Descent Speed: 2m/s
- Max Flight Speed: 15m/s(Not Recommended)
- Take-off Weight: ~1300g
- Operating Temperature: -10°C 50°C

Self-Tightening Propellers

For in-depth info see <http://www.dji.com/product/phantom-2/spec>

Maintenance

To ensure safe operational control a maintenance schedule will be followed, a personal tailored maintenance manual has been created, and quality replacement part will be used.

Inspection: Before and after every flight, the quadcopter's operational condition will be inspected for damage and deterioration, paying attention to the props for damage, cracks or wear and the UASs fuselage for damage. If damage, cracks or unusual wear is detected the flight will be suspended until proper repairs have been made.

Maintenance

- Simon Newton's Maintenance Videos
<https://www.youtube.com/watch?v=7Jum34eU4W8>
- Also
<http://www.phantompilots.com/viewtopic.php?f=7&t=5148>
- Other tutorials and how-to videos
Hypervision Australia Tutorials
<https://www.youtube.com/watch?v=fKIAfjtdPgI&list=PLX7-5smcu-Vw38bmfMnunAESCTiNgbt8S>

Replacement Parts

- Dji (manufacturer)
- Reputable After Market Companies

There is no intention in modifying aircraft beyond factory specifications.

- The UAS will be in compliance with the FAA airworthiness regulations.

Safety Concerns

Prop guards: Prop guards such as the DJI manufactures guards listed here <https://store.dji.com/product/phantom-2-series-propeller-guard> will always be in use during commercial flights.

Hazards Spotter: To ensure safety, either the listing agent, seller, contractor, owner or another party, will be on site to review and observe hazards before and during the flight.

Population of Intended Areas: To ensure safety, all non-essential personnel will be removed from the area. There will be no flight over heavily populated areas like stadiums, schools, malls, casinos, and the like during operating hours.

Airports: According FAA rules and to ensure pilot(s) safety, there will no flight in or around airports unless explicit permission is granted according to current FAA regulations.

Weather: To ensure safety of spotter, agents, property owners, pet and wildlife flights will be conducted in optimal weather conditions. Flights will not be conducted in winds above 20 mph.

Return-to-Home Feature: In the event the DJI Phantom 2 v2 H3-3D loses signal or runs critically low on battery the UAS has a GPS controlled return to home feature. The "home" is set upon flight startup.

- Auto Return-to-Home & Landing
- See Pre-Flight Checklist Exhibit A

Flying in Confined Areas: There is a high probability of flying in confined spaces, around residential properties. Pilot and spotter will be in constant communication by two way radio, or cell phone, or other approved FAA communications device when geographically separated during flight to ensure awareness of obstacles, hazards and UAS location.

Line of Site: The UAS will always be within the line of site of the pilot and spotter. If the UAS cannot be seen the return home failsafe will be used to regain visual control.

Height: Fights will not exceed 400 ft AGL above subject properties at any time.

Potential Hazards

The following are potential hazards that may, or may not be, present during flight operations. The Pilot and Spotter will be aware of :

- Other UASs
- Houses, Commercial Buildings, Shops, and Out Buildings
- Power Lines, Low Voltage Lines, High Voltage Lines, Cable Lines
- Trees, Shrubs, and Hedges
- Automobiles and RVs
- Wildlife, both Land and Air
- Rivers, Lakes, Ponds, Sounds, Straits, and Other Bodies of Water
- Unaccounted for People
- Unaccounted for Pets
- Conditions as set forth in the DJI Manual

Insurance Coverage

Commercial UAS insurance coverage is not currently available through private insurers or through AMA (Academy of Model Aeronautics).

Privacy Concerns

During flight operations privacy concerns are of high priority.

With each commercial flight a signed agreement, will be in place.

Seller/property owner, contractor, engineer or authorized agent will sign a letter authorizing the Lloyd & Associates UAS's use for marketing purposes. -

Exhibit B

Neighboring parcels or properties: During each flight operation, the UAS pilot will be extremely mindful of neighboring parcels to not film, record, or take pictures of people and property without their written & signed consent.

All neighboring properties will be cropped from photos unless authorization to use such photos is granted in writing.

Suburban Homes & Properties

Homes that are within residential neighborhoods, it is easy for the camera's field of view to record and take pictures of homes and properties that are not intended to be advertised for sale. As the UAS increases altitude, so does the risk of inadvertently filming a home or property that hasn't given written permission to do so.

Where privacy is a concern images will be cropped to omit neighboring properties.

Privacy Concerns Cont.

Properties with Acreage

Homes and properties with acreage have a higher degree of uncertainty when trying to determine lot lines, boundaries, and proximity to neighboring properties than a suburban home. Also, people looking to purchase a home with acreage, or a larger lot, have a higher degree of interest on knowing where the approximate lot lines are and an aerial perspective affords them such information. The use of an UAS would be the most effeminate means to provide such information.

Homes with View & Waterfront

People looking to purchase and/or sell a home, or a property, with a view, or on waterfront, want to see the home or property from an aerial perspective and to be showcased in this format. This is part of property owner profile. In addition, even though neighboring parcels might be shown in the picture and video, the neighboring properties will only be included if it is necessary to the subject property's marketing materials.

* All flights will occur over private or controlled access property with the property owner's prior consent and knowledge. Images taken will be of individuals who have also consented to being filmed or otherwise have agreed to be in the area where aerial photography will take place. Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012--size, weight, speed, operating capabilities, proximity to airports and populated areas and operation within visual line of sight and national security - provide more than adequate justification for the grant of the requested exemptions allowing commercial operation of applicant's UAS in the construction, realty industry pursuant to the DJI Manual and this document appended hereto.*

Operational Conditions

To capture high resolution images and video operational conditions will be closely monitored because showcasing a property in the best light is and image quality is the utmost client priority.

Day Time

- o Sunny Weather is Highly Preferred
- o Little to No Cloud Cover
- o Zero to Low Wind Speeds
- o High Visibility Conditions

*No night-time operations are permitted.

Pilot Qualifications

Training Sessions for a Lloyd & Associates certified pilot(s).

Current Pilot: Mike Lloyd

Pilot's Flight Log; Exhibit C

- The Pilot in command will be familiar with current FAA regulations regarding UAS commercial usage.
- The Pilot in command will have sufficient eye sight (with or without corrective lenses and without the aid of binoculars) to see and operate the UAS at the distances necessary for the purpose of the flight.
- Pilot will be in good health.
- New Pilots in training will shadow and act as the Pilot in Command Spotter for 3 Months or for a minimum of 20 hours Prior to First Flight Operations
- New Pilots will demonstrate a workable knowledge of the UAS and proficiency in operational control at all times.
- Pilots in training will Watch Online Training Videos.
- Pilots will watch Online Training Videos for Specific Type of Filming Needs
- Pilots will attend Upcoming, and Local, UAS Courses (This is Part of Pilot's Continuing Education)
- Pilots will attend Local Courses Hosted by Dji (This is Part of Pilot's Continuing Education)
- Every Pilot Will Follow the Flight Plans and Schedules Set Forth in this Document and current FAA regulations.

Pre-Flight Checklist

Prior to every flight, the pilot will go through a pre-flight checklist. The checklist will then be filed with every property's file in the event of an audit.

Preflight Checklist: SEE Exhibit A

Active Flight Operations

Exercise continuous control of UAS, monitor potential hazards, be aware of changing environments that may present hazards. UAS will always be in view of Pilot and spotter. There will be a strict flight ceiling of 400 ft AGL. All flight will be done in accordance with current FAA rules and the conditions set forth in this document.

Additional Resources

-<http://knowbeforeyoufly.org/>

-<http://www.dji.com/newpilot>

<https://www.youtube.com/channel/UCRioWtWR9BPVZK8>

YxMrH2Zw-<http://www.modelaircraft.org/>

- <http://www.dji.com/product/phantom-2/download>

- <http://www.dji.com/product/phantom-2/sec>

- <http://www.dji.com/support>

-[http://wiki.dji.com/en/index.php/Phantom 2](http://wiki.dji.com/en/index.php/Phantom_2)

-[http://wiki.dji.com/en/index.php/Phantom 2 Vision%20 Flight Limits](http://wiki.dji.com/en/index.php/Phantom_2_Vision%20Flight_Limits)

-<http://www.dji.com/newpilot>

Exhibit A

Pre-Flight Checklist

Flight Operation Location: _____

Pilot: _____

Date: _____

- ✓ Conduct Walk Around of Flight Area
- ✓ Identify Potential Hazards with Spotter
- ✓ Locate Safe Launch & Landing Area
- ✓ Set Spotter (Spotter May Change Location due to Filming Angle) Secure all Pets
- ✓ Request on Non-Essential Personnel to Remain Behind Pilot
- ✓ Unpack All Equipment from Transportation Case
- ✓ Inspect UAS for damage, wear and proper flight setup according to the DJI manual. If no damage or unusual wear is detected proceed to the next step. If damage is detected the flight will be aborted until proper repairs are completed.
- ✓ If the UAS is deemed flight worthy - Power Up Remote
- ✓ Power Up GoPro
- ✓ Initiate Video Recording
- ✓ Power Up DJI Phantom 2
- ✓ Launch DJI Phantom 2
- ✓ Conduct Flight Operations
- ✓ Land DJI Phantom 2 in Designated Landing Area
- ✓ Power Down DJI Phantom 2
- ✓ Turn Off Video Recording
- ✓ Power Down GoPro
- ✓ Power Down Remote
- ✓ Inspect UAS for damage and wear
- ✓ Put All Equipment Back into Transportation Case

Pilot Signature _____

Exhibit B

RE: Authorization to Record Video & Photograph Property

I, _____, legal seller and/or representative, authorize and give permission to Lloyd & Associates to record video and photograph the property commonly known as:

The recorded video and photography is to be used in a manner consistent with the clients interests, current real estate marketing strategies and advertising techniques, property development, investigation and observation.

Sincerely,

Signature _____ Date _____

Signature _____ Date _____

Exhibit C

UAS Flight log

Pilot; Mike Lloyd

Date	Hours	Location	Project
9-10-14	2	Home-213Curtis Dr Vista CA	personal
9-11-14	1	Home	Personal
9-12-14	1	Home	Personal
9-14-14	2	Home	Personal
9-18-14	1	Vista Sports Park	Personal
9-20-14	2	Vista Sports Park	Personal
9-21-14	2	Home	Personal
9-23-14	1	Home	Filming tests
9-25-14	2	Home	Filming tests
9-26-14	1	Home	Filming
9-28-14	1	Home	Filming

Estimated Hours Between 10-1-14 and 2-19-15 = 24-30 hrs