

UC UAS Policy Guidance Document

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Preface



The UC Center of Excellence on Unmanned Aircraft System Safety provides the following non-binding guidance to assist in the implementation of the Presidential Unmanned Aircraft System Policy (Policy), including the management of UAS Activity at University locations and the development of Location Specific Policies or Procedures regarding the use of UAS at University locations.

The guidance is intended to 1) elaborate on the current regulatory environment and compliance requirements, 2) describe suitable means of compliance with the UC UAS Policy and 3) provide example language that may be used in location specific policy or procedures or in communication.

To the extent of any inconsistencies between the minimum requirements set in the UC UAS Policy or this guidance document and any applicable regulation, the regulatory requirements govern.

This document is expected to continue to be revised and updated regularly as a result of regulatory changes, improvements to safety best practices and user feedback.

Address comments to UASSafety@ucmerced.edu

Revision History

Date	Rev	Notes
2018/01/26	1.0	Initial Document
2018/07/01	1.1	Fixed minor errors, updated Frequently Asked Questions, added new content
2020/07/01	2.0	Moved Online, updated FAA regulations, and moved some items around to improve readability

Chapter 1

The Presidential UAS Policy

The purpose of the University of California (UC) Presidential Policy on Unmanned Aircraft Systems is to establish minimum standards for the safe use and operation of Unmanned Aircraft System and Small Unmanned Aircraft System, including drones and model aircraft, on any University Location or for any University Business. The Policy requires that all UAS operations are performed in a manner that mitigates risk to safety, security and privacy, and ensures compliance with any applicable regulation. A copy of the text of the Policy can be found in Chapter 25.

The scope of the policy includes:

- The operation of any Unmanned Aircraft owned by the UC.
- The operation of any Unmanned Aircraft at or within the property owned or managed by the UC.
- The operation of any Unmanned Aircraft used for University Business.

The Policy is summarized as below:

- The Policy establishes a Systemwide Designated UAS Authority.
- The Policy establishes the development of a UAS Advisory Board.
- The Policy establishes that an Executive Officer of a University Location may appoint a Designated Local Authority.
- The Policy establishes that an Executive Officer of a University Location may authorize the development and implementation of location specific policies or procedures at any University Location within the Executive Officer's jurisdiction.
- The Policy establishes that anyone who seeks to operate a UAS under the jurisdiction of this policy must:
 - Comply with any applicable regulation.
 - Have prior approval from a Designated Local Authority or Systemwide Designated UAS Authority.
 - Operate in a manner that ensures public safety, right to privacy, civil rights and civil liberties.
 - Maintain sufficient liability insurance coverage.
- All UAS activity under this Policy must be documented and reported.
- All UC-owned UAS must be properly registered to the UC and submitted to the Designated Local Authority or Systemwide Designated UAS Authority.
- Registration documents for UAS used for University Business must be submitted to the Designated Local Authority or Systemwide Designated UAS Authority.
- All UAS activity must have aviation liability coverage.
- All UAS activity foreign nations or by foreign nationals must follow export control regulations and the UC Export Control Policy.

1.1 Role of the Presidential UAS Policy

The use of UAS is very nuanced across the wide diversity of use and few static generalizations regarding standards are appropriate. The Policy is intended to be flexible and adaptive to a wide range of needs. It is not intended for direct implementation for end-users, rather it is intended for a University Location to aid in the oversight and management of UAS by setting uniform minimum compliance standards and in the establishment of a Designated Local Authority to provide services at the end-user level, department level, campus level and system level.

The value of the Policy is in the structure of the management of UAS activity. By establishing a common process and listing out roles and responsibilities, the Policy provides the UC system with:

- Access to UAS subject matter experts.
- Standardized interpretation of UAS related regulations.
- Ability to share best practices across campuses.
- Transparency and accountability on UAS activity.
- Transparency and accountability on UAS activity request reviews.

1.2 Role of the Systemwide Designated Authority

The role of the Systemwide Designated UAS Authority is defined as

- Provides interpretation of UAS regulations.
- Develops internal University policies on certification and flight safety training.
- Reviewing and approving applications for operation of UAS at a University Location or for University Business.
- Maintains a record of all UAS activity within the scope of the Policy.
- Ensures Policy compliance with applicable laws and regulations.
- Tracks and manages the University response to pending and upcoming UAS legislation, regulations, policies and guidances.

1.3 Role of the UAS Advisory Board

The UAS Advisory Board is responsible for:

- Reviewing exemptions from the Policy.
- Assisting in the development of systemwide UAS policies.
- Reviewing and commenting on proposed policies and long-term goals.
- Evaluating the effectiveness of systemwide UAS policies and safety metrics.
- Ensuring that systemwide UAS policies remain consistent with applicable privacy best practices (See Chapter 16).

Active areas of discussion for the UAS Advisory Board are anticipated to include:

- Guidance and standards on location specific policy or procedure.
- Proposed UAS regulations on UAS activity above non-participating persons.
- Proposed UAS regulations related to UAS delivery services.
- Counter-UAS technology deployment and use.
- Delivery services.

1.4 Outside of the Scope of the Systemwide Policy

UAS Activity not covered within the scope of the Policy:

- Personally-owned Unmanned Aircraft not used for University Business and not flown at a University Location.

- Personally-owned Unmanned Aircraft used for coursework (Chapter 11) and not used at a University Location
- Student club-owned Unmanned Aircraft not used at a University Location

The use of UAS by Emergency First Responders may additionally be exempt as necessary. However, any use of UAS by Emergency First Responders must follow their internal department protocols.

1.5 Congruence With Existing UCOP Policies

All efforts have been made to ensure that the Policy is congruent with existing UCOP policies.

Examples of congruence with existing UCOP policies:

- APM 015-016 addresses the Faculty Code of Contact and the administration of discipline in regards to policy non-compliance.
- APM 150-160 addresses Non-Senate Academic Appointees Grievances and Corrective Actions in regards to policy non-compliance.
- BFB-BUS-19: Registration and Licensing of University-Owned Vehicles addresses registration and requires that all motor vehicles, aircraft and watercraft shall be registered on behalf of the University by the designated University location representative and the designated University location representative ensures governmental compliance.
- BFB-BUS-29: Management and Control of University Equipment establishes the requirements of management and control of UC equipment.
- BFB-BUS-81: Insurance Programs establishes that the University purchases aviation insurance to provide coverage for liabilities arising from the University's aviation operations that result in bodily injury and/or property damage.
- PACAOS-14: Definitions establishes common definitions used in Policies Applying to Campus Activities, Organizations and Students (PACAOS), including definitions of 'Campus', 'Property' and 'University'.
- PACAOS-30: Policy on Speech and Advocacy establishes that the University is committed to assuring that all persons may exercise their constitutional rights.
- PACAOS-40: Policy on Use of University Properties establishes the policy on the use of University properties that provides the basis for oversight.
- PACAOS-100.00 Policy on Student Conduct and Discipline addresses policy non-compliance for students and visitors to a University Location.
- PPSM 62-65 addresses policy non-compliance for employees and staff members of the UC.
- Management of Health, Safety and the Environment states that all University Activities are to be conducted in a manner than ensures the protection of students, faculty, staff, visitors, the public, property and the environment.
- Policy on Reporting and Investigating Allegations of Suspected Improper Governmental Activities addresses the responsibility of the UC to detect, prevent or deter improper activities.
- Export Control Policy addresses requirements for export controlled equipment (including UAS) and their use internationally and by foreign nationals.

Chapter 2

Campus or Medical Center Authority

Campus and Medical Center Executive Officer (or their designees) may elect to appoint a Designated Local Authority and to authorize the development and implementation of location specific policies or procedures.

As many University Location have experienced, UAS activity is diverse. Documented UAS activity have included:

- Engineering coursework – Indoors and Outdoors
- On-campus UAS research flights
- Fieldwork within the UC Natural Reserve System
- Fieldwork on private property
- Research projects at UC Division of Agriculture and Natural Resources Research and Extension Centers
- Student drone clubs and student recreation
- Campus Media and Strategic Communications
- Facility Management and Construction Monitoring
- 3rd Party Contractors
- 3rd Party Film Crews

Even within similar purposes and locations, different risk factors may lead to drastically different Risk Score. It is strongly recommended that University Location develop a location specific policy or procedure that can scale appropriately.

2.1 Location-Specific Policy

Each Campus and Medical Center is encouraged to develop a location specific policy or procedure to address local issues.

A location specific policy or procedure may include but is not limited to addressing the following questions:

- Who approves flights for the location?
- Will departments or subgroups have the autonomy to approve flights with consultation from the Designated Local Authority?
- Who should be notified regarding on-campus UAS activity?
- What are the terms of approval?
- Who has priority to operate a UAS?
- Specific areas where UAS activity is prohibited
- Availability of areas where UAS activity may be operated recreationally
- How long an approval may be valid?
- Enforcement of UAS policies
- Creation of a UAS committee or working group to advice local policies

- Procedures regarding the purchase of a UAS
- Standards regarding privacy

A Campus or Medical Center may elect to not develop a location-specific policy, in which the Designated Local Authority (if appointed) or Systemwide Designated UAS Authority (if no Designated Local Authority is appointed) may review and approve UAS activity on a case-by-case basis.

2.2 Designated Local Authority

The Designated Local Authority is a local authority that serves as a single point of contact for UAS activity for a University Location. This single point of contact serves as a means to funnel UAS inquiries, including purchasing and Flight Request, across the University Location for standardized information and interpretations.

The responsibilities of a Designated Local Authority may additionally be delegated and shared across multiple departments as long as there remains a focal point for coordination and records.

2.2.1 Example Roles & Responsibilities

- Is responsible for regulatory compliance and risk management of UAS activity within their authority.
- Maintains a list of UAS UAS activity.
- Coordinates UAS activity across multiple departments for appropriate reviews.
- Ensures UAS liability insurance coverage for all activity.
- Reviews and interprets applicable regulations and policies at the campus-level.
- Serve as the liaison between regulatory agencies and the operators.

As many Designated Local Authority are housed in Environmental Health & Safety or Risk Management departments, they may also fulfill additional roles expected of those departments.

- Provide consultation on UAS activity - safe flying locations, hazard analysis, equipment use.
- Provide flight instruction.
- Conduct lab or field safety audits.
- Remedy faults and remediates poor safety training.

2.3 Congruence with Existing Campus Policies

Any UAS activity on a University Location must comply with any existing policy or procedure. As UAS activity is a new and growing trend, it is not uncommon that a proponent is unfamiliar with the breadth of existing policies.

Some common policies to review for

- Delegation of Authority
- Policy on Use and Scheduling Properties
- Policy on Filming and Photography
- Materiel Management and Property Inventory Control
- Policy on Lab Safety
- Policy on Field Safety
- Privacy Policies
- Use of UC Managed Reserves or Field Stations
- Campus Recreation and Facilities
- Police Authority and Jurisdiction

An effective location specific policy or procedure would include steps to ensure compliance with any applicable existing policy through an agreed upon process with any relevant authorities.

Chapter 3

Background on UAS Regulations

There are a range of UAS related regulations that may be applicable in any given UAS activity. Different regulations may apply based on

- Purpose
- Location
- Ownership

A determination of which regulations are applicable is a component of the Flight Request as described in Chapter 5.

A note on rules and regulations within the United States: When a bill written by the United States Congress is enacted, it becomes Public Law and is written into the United States Code (USC). In contrast, the Code of Federal Regulations (CFR) contains all of the regulations promulgated by Executive Agencies such as the FAA. Executive Agencies are responsible for enforcement and implementation of their relevant statutes within the USC. As such, the CFR contains the regulations put in place by the FAA that put statutes from the USC into administrative practice.

The UC is held liable for all UAS activity by UC-owned UA and UAS activity for University Business. Federal law states that it is illegal to hire an aircraft operator if that operator does not have the correct airman's certificate ¹. Additionally, Federal Case law has held up that the owner of an aircraft may be held liable if an aircraft is knowingly operated illegally ².

3.1 Federal Aviation Administration Regulations

Most FAA regulations that are relevant are found within Title 14 of the Code of Federal Regulations, Part 107 - SMALL UNMANNED AIRCRAFT SYSTEMS. This set of regulations are specific for Small Unmanned Aircraft System and introduces a new FAA-issued Remote Pilot Certificate for the operation of Small Unmanned Aircraft System only. A summary and compliance list for 14 CFR 107 can be found in Chapter 26.1.

Regulations regarding the registration of sUAS are found within 14 CFR 48. For Unmanned Aircraft above 55 lbs (total take-off weight) must be registered under the regulations described in 14 CFR 47. Under 14 CFR 48, sUAS must be registered with individual registration numbers, while Unmanned Aircraft used exclusively for recreation may be registered as a group under the owner of the UA.

¹49 USC 46306(b)(8)

²FAA Order No. 96-17, Docket No. CP93SO0414

3.1.1 Model Aircraft

The FAA Reauthorization Act of 2018 abolished the legal terminology of ‘model aircraft.’ All aircraft without a person inside or on-top controlling it are considered ‘unmanned’ regardless of size or intent of purpose. At the time of writing, FAA has not yet propagated updated FAA regulations concerning the implementation of the replacement regulations introduced in the United States Code (See Section 3.2.1)

3.1.2 Gaps in FAA Regulations

It is a common misconception that FAA regulations are the only regulations that apply to UAS. However this is not the case. The FAA has wide domain of jurisdiction - it’s major roles include:

- Safety Regulation
- Airspace and Air Traffic Management
- Air Navigation Facilities
- Aircraft certification
- Airmen certification

The FAA however has several notable gaps as they may apply to UAS. The FAA does not have jurisdiction for rulemaking on:

- Issues relating to privacy.
- Issues relating to insurance requirements.
- Issues related to negative impacts to wildlife or the environment.
- Issues related to civil rights and liberties
- Issues related to trespass and disturbing the peace.
- Issues related to UAS inside buildings or in foreign airspace.

Many of these gaps are noted within the FAA’s justification of Part 107 regulations ([Link](#)).

These issues are typically addressed by other federal or state regulations. While some issues are well-known or logical, others may be misunderstood. Nonetheless, all of these issues are of concern to the UC and as such were included in the Policy.

Hyperbolic Scenarios

- FAA regulations do not prohibit the throwing of turkeys out of aircraft.
- FAA regulations do not prohibit spying through bathroom windows.
- FAA regulations do not prohibit conducting aerial surveillance of strikes or protests
- FAA regulations do not prohibit a UAS from stealing when flown indoors.
- FAA regulations do not restrict foreign nationals from working with ITAR or other export controlled equipment.

3.2 United States Code

The overarching statutes that oversee the FAA and aviation programs are found in Title 49 of the USC, Title 49 - TRANSPORTATION, Subtitle VII - Aviation Programs. Relevant chapters include:

- Chapter 401. General Provisions
- Chapter 441. Registration and Recordation of Aircraft
- Chapter 447. Safety Regulation
- Chapter 448. Unmanned Aircraft Systems
- Chapter 463. Penalties

3.2.1 Exception for Limited Recreational Operations of Unmanned Aircraft

The FAA Reauthorization Act of 2018 introduced Section 44809 to Title 49 of the USC. This section significantly altered the regulations that previously applied to ‘Model Aircraft.’ At the time of writing, the FAA

has not yet promulgated updated regulations within the CFR that address the updated regulations. In the interim, the FAA is selectively enforcing the USC statutes as necessary. Under the new statutes, certain flight operations may be exempt from 14 CFR 107 regulations if they are considered strictly recreational and abide by the safety standards set by the safety guidelines of a recognized CBO. Additionally, for the purposes of this exemption, certain academic activities, including research and coursework may be considered exempt from 14 CFR 107 regulations. More information on Limited Recreational Operations can be found in Chapter 26.2.

3.2.2 Other Relevant Statute Implications

- Operating an aircraft without registration or any necessary airman certification can result in a penalty with a maximum of 3 years in prison and/or \$250,000 fine - 49 USC 46306(b) and (d)
- A knowing and willful violation of 49 USC 40103(b)(3) applies to cases such as the unauthorized operation of a UAS within the Washington, DC, Flight Restriction Zone. The penalty is a maximum of 1 year in prison and/or \$100,000 fine - 49 USC 46307.
- The willful interference, with the intent to endanger the safety of any person or with a reckless disregard for the safety of human life, of anyone engaged in the authorized operation of an aircraft or any air navigation facility aiding in the navigation of any such aircraft is a criminal violation that has a maximum penalty of 20 years in prison and/or \$250,000 fine - 18 USC 32.
- Interference with wildfire suppression, law enforcement or emergency response effort by operation of unmanned aircraft may be penalized with a maximum of a \$20,000 fine per violation - 49 USC 46320.

3.3 State and Local Regulations

In addition to federal regulations, many states, counties and municipalities are also drafting relevant UAS regulations. While the FAA has jurisdiction over the NAS, other powers may issue regulations. From the FAA, ‘laws traditionally related to state and local police power - including land use, zoning, privacy, trespass, and law enforcement operations - generally are not subject to Federal Regulations.’ Example regulations have included zoning restrictions on when and where UAS may take off or land, or extra penalties for the use of UAS in the invasion of privacy.

Examples of Local and State Laws

- Reckless Endangerment
- Privacy
- Noise
- Interference with Law Enforcement
- Assault, Battery
- Trespass
- State Aviation/motor vehicle laws

3.4 International UAS regulations

Outside of the US, many countries have also adopted UAS regulations with varying levels of restrictions. Currently, there is no reciprocity between the US and any other country’s UAS regulations. There is no blanket allowance of a US certification in another country and the FAA does not recognize any other country’s UAS license. Regulations abroad are also changing rapidly and currently require regular review prior to UAS activity.

3.5 Jurisdiction of the University of California

The UC has legal standing to implement regulations, policies, or procedures of activity on University Location. This includes defining where aircraft may be launched or land, and whether persons standing on

a University Location may or may not operate equipment or machinery. The UC has legal standing to implement regulations, policies or procedures for the use of any Unmanned Aircraft owned by the UC.

The UC does not have legal standing to implement regulations, policies or procedures regarding overflight of UC property as this remains the jurisdiction of the FAA. The UC may not enforce a general prohibition of any aircraft from flying above a University Location.

However, other non-aviation regulations may be violated during an overflight of a University Location and may be enforceable by law enforcement. As an example, the invasion of privacy is under state jurisdiction and within the state of California, ‘a person is liable for physical invasion of privacy when the person knowingly enters onto the land or into the airspace above the land of another person without permission or otherwise commits a trespass in order to capture any type of visual image, sound recording, or other physical impression of the plaintiff engaging in a private, personal or familial activity and the invasion occurs in a manner that is offensive to a reasonable person’³. Other laws, such as trespass and nuisance, may also be applicable during an overflight of a University Location.

³CA Civil Code 1708.8(a)

Chapter 4

Registration of UAS

Within the US, all UA must be registered under the regulations specified by 14 CFR 47 or 14 CFR 48, depending on the weight of the aircraft, location of the aircraft's operation or primary purpose of the aircraft. Aircraft flown exclusively outside the US or within military airspace may be subject to other registration requirements.

4.1 Registration of UC-owned UAS

The Regents are the legal owners of all UC property. Similarly to BFB-BUS-19: Registration and Licensing of University-Owned Vehicles, all UC-owned UA must be registered to the "Regents of the University of California" to meet compliance obligations under 14 CFR 47 or 14 CFR 48 (See Figure 4.1)



Figure 4.1: Example UAS Registration Certificate

All UAS that weigh between 0.55 lbs and 55 lbs (under 14 CFR 48) must be registered online at <https://faadronezone.faa.gov/>.

UAS that weigh more than 55 lbs or are required to have UAS registration that is valid internationally must be registered under 14 CFR 47 and must be done through mail with an Original Aircraft Registration Form, AC Form 8050-1.

4.2 Registration of Model Aircraft

Model Aircraft are required to be registered under 14 CFR 48. Though typically most UAS owned by the UC will be registered individually, there are some cases where they may be registered as MA.

In general, UAS that are used exclusively as model aircraft may be registered as a group under the owner of the model aircraft. In the case of the group or company owned model aircraft, they may be registered under the primary user or manager of the model aircraft as the model aircraft registration is not considered proof of ownership.

Common Scenarios for Model Aircraft

- Model Aircraft owned by students should be registered by the student
- Model Aircraft owned by a student club can be registered by a member of the student club, a club mentor or faculty adviser.
- Model Aircraft used in classroom or educational activity should have the faculty, instructor or department staff member register for an FAA registration number to be placed on all aircraft.

4.3 Record Keeping Policy Requirements

Records of UC-owned UAS registration must be provided to the designated local authority or the systemwide designated authority. Registration of all unmanned aircraft used for University business must be provided to the designated local authority or the systemwide designated authority. UC Drones may be used to submit records electronically and other electronic submission processes may be available in the future. A University location may additionally implement a centralized registration process using a single FAA online account.

4.4 Fraudulent Drone Registration Websites

Unfortunately, there are several fraudulent websites that advertise Drone registration. The only registration site is at <https://faadronezone.faa.gov/> and registration only costs \$5 per aircraft. UAS registration through the FAA's website requires you to create an account with the FAA, but is otherwise instantaneous. Any website that offers to register an aircraft on your behalf, or offers an 'enhanced' or 'expedited' registration is fraudulent. The correct website looks as in Figure 4.2

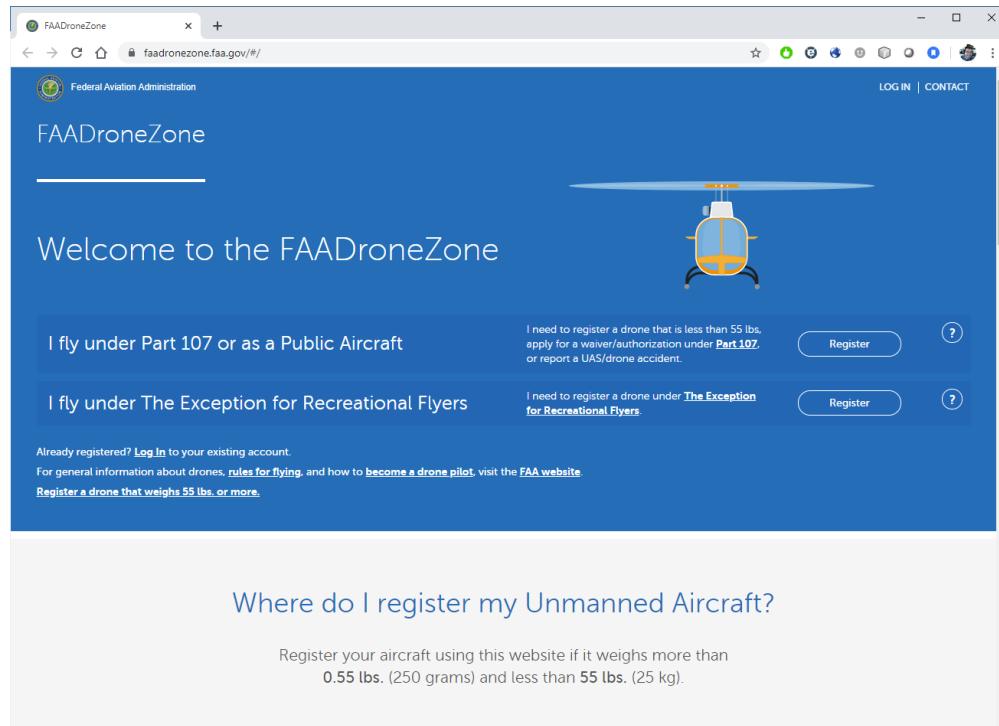


Figure 4.2: FAA DroneZone

Chapter 5

Review of UAS Activity

5.1 General Procedures

The Flight Request process provides the University of California the ability to validate whether the proposed use complies with the Policy that requires all operations are performed in a manner that mitigates risks to safety, security, privacy and ensures compliance with any applicable regulation. All persons seeking to operate a UAS covered within the Policy must submit a UAS Request Form to the Designated Local Authority or Systemwide Designated UAS Authority if a Designated Local Authority has not been appointed for a University Location.

The Policy requires that the review of a proposed operation must be responded to within two weeks.

Approvals for UAS activity may be granted in many forms:

- Single or set of UAS flights during a specific time-window
- Set of UAS flights over a defined period of time
- Scheduled recurrent UAS flights at a defined location
- Unscheduled UAS usage at a series of predefined locations
- Standing approvals

Records of approval and the terms of the approval must be kept by the Designated Local Authority and the Systemwide Designated UAS Authority.

5.2 Submission of UAS Request Form

The UAS Request Form is a documented request of UAS activity. An example form can be made available by a Designated Local Authority or Systemwide Designated UAS Authority (Figure 5.1). The Policy does not mandate a specific form or system for submitting a UAS Request Form. UC Risk and Safety Solutions has developed UC Drones UAS Request Form as a means to standardize request information and is available for all UC campuses (More information on UC Drones in Section 13.1). A University Location may also establish a specialized form for any UAS activity as long as it collects sufficient information to conduct a review of the UAS activity to ensure Policy compliance (Figure 5.2).

5.3 Reviewer of UAS Activity

The Policy grants authority to review UAS activity to the Systemwide Designated UAS Authority and the Designated Local Authority. Per the Policy, the Systemwide Designated UAS Authority may review UAS activity unless a Designated Local Authority is assigned to review UAS activity at a campus. In many cases,

Flight Information

Aircraft	Pilot	Contact
Search by registration #	Search by last name, first name	Brandon Stark bstark2@ucmerced.edu FIRE AND BUILDING SAFETY Change Contact

Flight Request

Flight Purpose	Flight Date	Flight Time
Flight Purpose (dropdown menu)	mm/dd/yyyy	hh:mm -
Expected Field Time	Enter in minutes	Number of Flights
Latitude	37.376578369252286	Longitude
		-120.41034141448588

Figure 5.1: Example UAS Flight Request Form - UC Drones

FACULTY & STAFF UC San Diego

blink

Blink Topics ▾ Personal Tools ▾ Business Tools ▾ Instruction Tools ▾ Research Tools ▾

HOME > Links > Environment, Health & Safety > UAS (Drones) Flight Request Form

UAS (Drones) Flight Request Form

Last Updated: May 26, 2017, 10:09:19 AM PDT. Give feedback.

Create UAS flight requests.

Please submit a minimum of 72 hours prior to proposed flight. You may use this form for single flights or multiple flights related to the same recreational use / project parameters.

Your Full Name *

First Last

Department / or Company *

Your Contact Phone *

Your Email *

FAA Authorization (Provide a copy of your authorization, e.g., FAA Pilot's License, Section 333 Exemption, Part 107)

Certificate of Insurance (Note: Required for non-UC applicants only. Provide a copy of your insurance coverage with UCSD listed as additionally insured during UAS flight operation dates.)

Figure 5.2: Example UAS Flight Request Form - UCSD

the Designated Local Authority is in a better position to evaluate the safety and impacts to privacy of UAS activity on their location.

As per the relationship between the Systemwide Designated UAS Authority and Designated Local Authority, the Systemwide Designated UAS Authority will provide interpretation of regulations, including international, federal, state and local, and provide subject matter expertise to the Designated Local Authority to pass the final judgment. It is expected that as campuses become more familiar with UAS regulations and their use, the majority of use cases may be handled completely by the Designated Local Authority.

A location specific policy or procedure may further establish the role of the Designated Local Authority and other campus entities that may be granted autonomy to review UAS activity.

5.4 Criteria Used to Evaluate UAS Activity

The Policy mandates that all UAS activity within the scope of the policy must be approved prior to flight. The review process must include:

- Review of compliance with applicable regulations (Section 5.4.1) and includes Export Control (Section 5.4.2).
- Review of impacts to safety (Section 5.4.3).
- Review of impacts to privacy, civil rights and liberties (Section 5.4.4).
- Review of insurance (Section 5.4.5).

The review process may additionally include

- Prioritization of University Business
- Approval of facility manager or other local authority
- Approval or consent of persons that may be impacted by the proposed operation
- Previous documented flight experience or expertise
- Impacts to wildlife or other environmental concerns

5.4.1 Evaluation of Regulatory Compliance

UAS regulations are regularly evolving; there are multiple legal pathways within the US and internationally. The Policy does not mandate exclusive compliance with a particular set of regulations. The Systemwide Designated UAS Authority is responsible for providing the interpretation to regulations for the Designated Local Authority.

Civil Regulations for Small Unmanned Aircraft Systems (14 CFR 107) - A large portion of UAS activity within the UC system falls under the recently released regulations in 14 CFR 107. There are 22 points of compliance as outlined in the 14 CFR 107 compliance list found in Section 26.1. If further regulations are issued that provide alternative legal pathways, they may be utilized without requiring modification to policy. By default within the United States, all UAS operations in the NAS are regulated under 14 CFR 107 unless it meets the exception criteria for limited exception for recreational purposes, PAO or with a Section 333 Exemption.

Exception for Limited Recreational Operations of Unmanned Aircraft - UAS activity may be exempt from 14 CFR 107 regulations if the flight operations complies with the exception for limited recreational operations of unmanned aircraft as described in 49 USC 44809. While this typically covers recreational activity, in specific situations academic research and coursework may also be covered. More information can be found in Section 26.2.

Public Agency Operations (14 CFR 91) - UAS activity may be conducted under 14 CFR 91 regulations when classified as a Public Agency Operation with a Public Aircraft. UAS activity requested as a Public Agency Operation should be reviewed on a case-by-case basis as these authorizations are often specific to an aircraft, location, purpose and organization, and may contain special restrictions or allowances. The Systemwide Designated UAS Authority is available to review and issue an interpretation for compliance.

Section 333 Exemptions (14 CFR 91) - UAS activity may be conducted under 14 CFR 91 regulations through a special exemption known as Section 333 Exemption (Section 333 of Public Law 112-95). Operations conducted through Section 333 exemptions should be reviewed on a case-by-case basis as these authorizations contain different restrictions and allowances, depending on use case.

International Regulations - UAS activity conducted outside of the US are subject to the host country's regulations. The Systemwide Designated UAS Authority maintains a database of international UAS regulations and will provide an interpretation of regulations as requested.

State or Local Regulations - Many states and cities have begun to implement local authority over UAS activity. There is currently no central database of such regulations, so these must be identified and reviewed on a case-by-case basis. The Systemwide Designated UAS Authority maintains a database of common state and local regulations requested by UC UAS activity. While the FAA maintains sole jurisdiction of the NAS, state and local authorities may enact regulations related to traditional police powers such as land use planning and zoning, health, safety and advertising.

5.4.2 Evaluation of Compliance with Export Control

Certain UAS may be export controlled under US Export Regulations and, as such, may not be physically exported outside the United States without a license from the US government. In addition, a license may be required if foreign nationals located within the US are provided access to the technology related to such systems (deemed exports). All UC individuals or organizations that intend to design, build, research, use in research, modify, dismantle, and/or operate a UAS in foreign countries and/or with foreign nationals in the US or abroad must do so in accordance with the Export regulations and the UC Export Control Policy. Documentation of UC-owned unmanned aircraft is additionally available for Export Control personnel to review.

5.4.3 Evaluation of Impacts with Safety

The review of the UAS activity is limited to the scope of campus or public safety. It does not review all safety implications.

As applicable, the Designated Local Authority or Systemwide Designated UAS Authority should review for

- Mitigation strategies for
 - Pedestrian Safety
 - Vehicular Safety
 - Loss of Control
- Crowd Control
- Sensitive Locations

Not all UAS activity will require a detailed review for minor or low risk activity. A primary means of mitigation for safety impacts is to relocate UAS activity to large, open areas away from non-participating persons.

The review of safety does not absolve the RPIC's responsibility to maintain a safe operating environment. The safety aspect of the review does not consider:

- Weather conditions
- Obstructions from ground hazards (Trees, temporary structures)
- Previous unrecorded flight experience

5.4.4 Evaluation of Impacts with Privacy, Civil Rights and Liberties

The use of UAS is still relatively new and there is still much trepidation regarding privacy, civil rights, liberties and UAS. Compliant with other UC policies regarding privacy, UAS activity must respect the

privacy of others and not infringe on their civil rights and liberties.

The perceived invasion of privacy is additionally to be avoided. It is unlikely that a proponent would blatantly propose activity that would invade a person's privacy. However, there may be proposed activity that may be perceived as potentially invading privacy. An example of this would be in UAS activity in close proximity to residential buildings. Regardless of the intent or business nature of the UAS activity, unless mitigating strategies are employed, such activities should be prohibited. Best practices regarding UAS activity are listed in Chapter 16.

5.4.5 Evaluation of Compliance with Insurance

All UAS activity must be covered by liability insurance. The UC provides automatic coverage for UAS activity for UC-owned Unmanned Aircraft. Additionally, personally owned Unmanned Aircraft used for University Business can be covered if the UAS activity is approved.

All 3rd Party UAS activity must submit appropriate insurance, including a written agreement which indemnifies and holds the University harmless from any resulting claims or harm to individuals and damage to University property.

More details are provided in Chapter 9.

5.5 Other Factors

At a minimum, the above criteria are necessary to be reviewed. However, there may be other factors that may be utilized at the discretion of a Designated Local Authority in accordance with a location specific policy or procedure.

This may include but is not limited to:

- Prioritization of University Business.
- Risk Score of UAS activity.
- Approval of facility manager or other local authority.
- Approval or consent of persons that may be impacted by the proposed operation.
- Previous documented flight experience or expertise.
- Impacts to wildlife or other environmental concerns.

There are currently only limited existing standards for UAS activity that may or may not be applicable within the UC system. A location specific policy or procedure may elect to adopt standards as they are developed. It is intended that the Systemwide Designated UAS Authority will continue to evaluate and provide recommendations for specific standards.

5.6 Relationship of a UC Review Process with Applicable Regulations

The University of California requires that all UAS activity comply with all applicable regulations, at the international, federal, state and local levels, as well as mitigates risks to safety, security and privacy. Additionally, a Designated Local Authority may choose to review other factors.

It is foreseeable that otherwise legal UAS activity may be prohibited or require modification by either the Designated Local Authority or Systemwide Designated UAS Authority.

Example of potential scenarios:

- Non-essential UAS activity in the vicinity of dorms where privacy concerns exist.
- UAS activity where the use of a UAS would disrupt other University Business such as commencement ceremonies or campus events.
- Proposed UAS activity that conflict with other previously approved UAS activity.

- Proposed UAS activity that is likely to violate FAA regulations such as direct flyovers of large areas of a busy campus.
- Proposed UAS activity requires the reservation of an athletics field that is occupied.
- Proposed UAS activity is above a preferred flight altitude limit for a specific location and may interfere with medical helicopter activity.

The review by a Designated Local Authority or Systemwide Designated UAS Authority also includes state or local regulations at sites such as California State Parks or County Park Systems. A UAS activity may be considered legal under FAA regulations, but may be prohibited by other regulations, and thus would not be approved. Due to the vast diversity of regulations at the state and local level, a review process may take longer at those sites.

5.7 Terms of Approval

In some cases, UAS activity approval may require additional terms or conditions. These may arise from UAS activity where additional flexibility is requested, such as recurrent UAS activity in a low-risk location. The Designated Local Authority or Systemwide Designated UAS Authority may attach additional requirements or procedures at their discretion.

Items to consider as part of the Terms of Approval

- Frequency of reporting.
- Currency requirements of the RPIC.
- Procedures to address rescheduling.
- Procedures for accident notification.

Example language that may be used in Terms of Approval can be found in Chapter 22.

Chapter 6

UAS Activity Reporting

The (ref:uaspostlight) of UAS activity is an important aspect of oversight, management and the development of future policies and procedures. The Policy mandates that post-flight reporting must be accomplished but does not specify details regarding the frequency or specific information requirements. This section provides guidance on establishing a successful reporting system.

All reporting must meet or exceed compliance with all applicable regulations and policies. Currently, the UC has 5 UAS specific reporting compliance obligations. The UC additionally has other reporting compliance obligations related to workplace safety and accident reporting.

6.1 UAS Reporting Compliance Obligations

- All UAS activity covered under the UC’s UAS insurance must be reported to the insurance broker on a quarterly basis.
- All UAS activity classified as a PAO must be reported to the FAA on a monthly basis.
- Records of UAS activity conducted under 14 CFR 107 may be requested by the FAA and must be made available.
- All UAS activity conducted under a systemwide FAA Airspace Authorization, Airspace Waiver or COA must be documented and made available to the FAA upon request.
- Any incident subject to FAA or NTSB reporting requirements
- Any incident subject to CalOSHA reporting requirements

6.2 UAS Safety Metric Tracking

An important aspect of regular UAS activity reporting is the tracking of safety metrics. Through the use of effective data collection, trends regarding UAS safety enables Designated Local Authorities to identify and make recommendations to adjust local procedures without compromising safety.

Flight record statistics may also be utilized for reviews for high Risk Score activity. Example scenarios include standing approval for media representatives who must maintain currency for UAS activity that require a higher level of expertise due to a higher Risk Score.

The UAS Advisory Board additionally reviews all UAS activity reporting for its analysis on the effectiveness of the Policy.

6.3 Collection of UAS Activity Reports

The Policy does not mandate a specific process for collection of a (ref:UASpostflight). A Designated Local Authority or location specific policy or procedure may opt to implement a different solution, depending on need or desired data. It is recommended that Post-Flight Reports be collected as immediately as possible from the proponent to minimize complacency and forgotten minor incidents.

Example Post Flight Report Collection

- UC Drones on a per day, per aircraft, per pilot basis.
- Excel spreadsheet of reports collected on a weekly basis.
- Webform generated report.
- Electronic submission via access to a commercial cloud solution.
- Scanned handwritten documents.

The webapp UC Drones provides Designated Local Authorities with a mechanism to collect and review UAS activity reports (See Section 13.1). Data entered in UC Drones may be made available to authorized personnel in compliance with UC policies.

6.4 UC Minimum Reporting Guidance

Flight record data must include sufficient information to be able to determine:

- Date
- Pilot
- Aircraft
- Location
- Number of flights
- Total flight time
- Accident or incident records

Flight records may additionally include

- Flight altitude or distance
- Telemetry data
- Fuel or Battery information
- Software/hardware configurations, including payload
- Weather conditions
- Images or other media of the UAS activity

6.5 3rd Party Reporting

UAS activity accomplished by a 3rd Party must be tracked and monitored. Failure to submit records may be considered in future UAS activity review.

6.6 Alternative Means of Compliance

In some use cases, it may be unfeasible to collect accurate flight record information.

Example scenarios:

- Indoor Activity
- Individual Recreational Model Aircraft
- Coursework with large groups of students

In these cases, the location specific policy or procedure or Designated Local Authority, in consultation with the Systemwide Designated UAS Authority and or the UAS Advisory Board may develop alternative means of compliance. Example solutions include low fidelity usage approximations on a daily or monthly summary.

Chapter 7

Non-Punative Reporting Statement

It is recognized that humans will make errors, accidents happen, and systems must be developed that are error tolerant and behaviors changed to lessen the chance of errors occurring. It is not the goal of the Policy to authorize the Systemwide Designated UAS Authority or Designated Local Authorities to seek out someone who has reported an error, accident, or mishap in order to administer retribution. All communications made by persons abiding by the UAS reporting requirements shall be made with the assurance that no retaliation or reprisal shall occur.

Upon the submission of a report describing an error, incident or accident, the Systemwide Designated UAS Authority or Designated Local Authority may reach out to the reporter for followup and clarification. It is important to note that the goal is not to punish, but to ensure it does not happen again.

Chapter 8

UAS Accident Reporting

All UAS accidents, incidents and malfunctions must be reported. This differs from FAA requirements under 14 CFR 107 because the UC has other reporting compliance obligations that it must meet. A Designated Local Authority or the Systemwide Designated UAS Authority will make a determination if the accident, incident or malfunction requires further reporting with the appropriate regulatory body.

In data collected from September 2016 to March 2018, UAS accidents, incidents or malfunctions that resulted in non-minor UAS damage, injury or property damage were caused by evenly between human-factors or system malfunctions.

8.1 Common Accidents, Incidents or Malfunctions

Some of common UAS accidents, incidents and malfunctions that have been reported include:

- Operator error resulting in collision with stationary object
- Loss of Battery/Fuel
- Fly-away/loss of control
- Hardware malfunctions such as GPS interference
- Improper ‘Return to Launch’ location
- Improper assembly of vehicle
- Experimental hardware/software
- Hazardous weather conditions
- Battery caught fire from puncture or impact

8.2 Exemptions

The following accidents, incidents and malfunctions are exempt from mandatory reporting, but are still welcome in post flight reports

- Malfunctions related to payloads that have no impact on safety
- Damage of components designed or expected to fail during regular use
- Rough or hard landings that do not result in damage
- Damage to the drone due to improper ground-handling/transportation

8.3 Near Misses

A near miss, also known as a close call or near hit, is defined as an unplanned event that did not result in injury or damage – but had the potential to do so. Typically, these events result from either unsafe

conditions, arising from the work environment itself, or unsafe acts, arising from UAS activities. Reporting a near-miss can ensure that future incidents and injuries are avoided.

Example Near-Misses

- Insufficient hazard analysis from utilizing out of date satellite imagery
- Interactions with non-participants or unaware university officials
- Interactions with wildlife
- Battery draining faster than normal

8.4 Accident Investigation

The Designated Local Authority or Systemwide Designated UAS Authority may initiate an investigation of a reported accident, incident, malfunction or reported near-miss situation. Any opportunity to better understand the root cause of a UAS accident is valuable. A process or procedure for accident investigation may be written into a location specific policy or procedure. Below are some general guidelines for conducting a UAS Accident Investigation (adapted from OSHA).

8.4.1 Incident Investigation Principles

- Do not assign blame to the reporter
- Remind everyone that the investigation is to learn and prevent, not to penalize
- Ensure everyone's narrative is heard

8.4.2 Process

- Call or gather the necessary persons to conduct the investigation
- Identify and gather witnesses (if applicable)
- Collect facts
- Collect a narrative from the RPIC and witnesses
- Document the incident with photos and videos (if applicable)
- Complete a report (if applicable)
 - Identify causes
 - Identify latent conditions
 - Identify corrective actions

8.4.3 Interviewing People

- Use open-ended questions
- State the purpose of the investigation is fact-finding, not fault-finding
- Ask the individual to recount their version of the event
- Ask clarifying questions to fill missing information
- Ask the individual what they think could have prevented the incident, focusing on the conditions and events preceding the event.

8.4.4 Information to Collect

- RPIC information
- UAS information, including
 - Hardware or Software firmware
 - Automated features of the Unmanned Aircraft used

- Time of Day
- Location
- Potential visual obstructions, including
 - Trees,
 - Powerlines,
 - People or crowds,
- Weather conditions, such as
 - Wind
 - Sun location
 - Clouds or Fog
- Supervisor information
- Potential witnesses
- Corrective actions
- Causal factors that may have played a role

8.4.5 Determining Causal Factors

Causal factors for an accident are rarely definitive and may be subjective. Some example causal factors to investigate include, but are not limited to:

- Was there external pressures that may have contributed to the incident, such as weather, pressure from management, time-limits, etc?
- Was the location a contributing factor?
- Was the management or oversight procedures a contributing factor?
 - Consider administrative or engineering factors
- Was equipment questionable but still used?
- Was there a miscommunication within the operating team?
- Were there any quick fixes/unplanned changes made in the field to complete the mission?

Chapter 9

UAS Insurance

9.1 Liability Coverage

The University of California has purchased an Unmanned Aircraft Liability Policy. This policy has a total of \$5 Mil limit with a \$1 Mil Personal Injury sublimit and \$1 Mil Products/Completed Operations sublimit.

Coverage is automatic for UAS activity that meet the following criteria:

- Flight operations are conducted on behalf and sanctioned by the University of California.
- Aircraft weight under 55 lbs (at time of takeoff)
- Flight operations are within VLOS
- Flight operations are below 400 ft above ground level.
- Flight operations must be conducted within the United States.

Any UAS activity that do not meet the above criteria or operate outside the above criteria must be reported to and approved by the insurance underwriter in order to be covered.

Any UAS activity that is not approved by a Designated Local Authority or Systemwide Designated UAS Authority is not covered by this liability insurance coverage.

9.1.1 Personally Owned Unmanned Aircraft Used for University Business

The University of California has extended their UAS liability policy to enable coverage of UAS owned by UC students, staff or faculty used for University Business, including research. Coverage is contingent on compliance with the policy and procedures on UAS usage. This coverage is not intended to cover student organizations or (ref:3rdParty) vendors or contractors.

9.1.2 Coverage for Campus Police

The University of California has extended their UAS liability policy to enable coverage of UAS by Campus Police. All coverage is contingent on the UAS activity being sanctioned by the UC.

Any UAS activity that is not approved by a Designated Local Authority or Systemwide Designated UAS Authority is not covered by this liability insurance.

9.2 Physical Damage Coverage

Physical damage to a UAS is covered under a blanket policy issued by the University's captive insurance company, Fiat Lux Risk and Insurance Company

- Coverage applies in flight only when an approved flight plan is filed in accordance with UC UAS Policy, including the UC Drone web app or other means of compliance.
- Coverage is limited to \$25,000 for Unmanned Aircrafts
- Payload is covered separately and not included within this limit
- \$1,000 deductible applies to each and every loss (including payload)
- Coverage additionally applies in the event of theft, vandalism, fire and other perils in accordance to the UC Property Insurance Program.
- In the event of a loss, please report to campus risk management.

This physical damage coverage does not extend to personally owned-UAS used for University Business. Only UAS owned by the University of California are covered.

9.2.1 Filing a Claim

To file a claim, contact your campus Risk Manager. Please prepare the following:

- Copy of the post-flight report (through UC Drones or other means of compliance)
- Photographs of damaged equipment
- Copy of original purchase invoice
- Copy of invoice to ship the equipment back the manufacturer
- Copy of repair invoice, if repairable
- Copy of replacement quote, if not repairable

Ensure your coverage

- Attach a copy of your UAS invoice to your UAS registration in UC Drones
- Make sure you file your Flight Requests
- For recurrent or on-going activity, create a Project application but don't forget to add flights before you head out.
- After an incident, make sure you take pictures of the damage and file a post-flight report. Add as much details as possible.

9.3 3rd Party Insurance Minimum

All 3rd Party UAS activity, including on behalf of the University or other users of campus space, must have liability insurance with a preferred limit of \$5 Mil. In addition to the limit that is provided by the RPIC, a certificate of insurance along with a copy of the endorsement listing the following insurance clauses should be issued prior to commencement of services:

1. Name The University and its directors, officers, employees, servants and agents (collectively, the "Indemnified Parties" and individually, the "Indemnified Party") as additional insureds, as their respective interests may appear
2. The RPIC's insurance shall be primary without any right of contribution from any other insurance available to The University
3. Include a cross liability or severability of interests among Indemnified Parties, providing that the insurance shall operate in all respects as if a separate policy had been issued covering each party insured
4. Include a waiver of subrogation in favor of the Indemnified Parties.
5. The certificate of insurance shall also provide that, in the event of a cancellation or material restrictive change of the policy which would adversely affect the interest of the Indemnified Parties, the insurers agree to provide 30 days prior written notice to The University.

Chapter 10

UAS Safety Guidelines

Safety is a moving target rather than a static definition. As technology and regulations change, different interpretations of how to achieve a safe operating environment evolve. What follows below are general guidelines to how UAS safety may be reviewed. The Systemwide Designated UAS Authority is additionally available to review.

Disclaimer: Not all UAS safety risks are capable to be reviewed. **The review of UAS safety does not absolve an RPIC's responsibility to ensure a safe operating environment.**

10.1 UAS Safety

UAS safety typically falls under two categories: (1) Planned Safety and (2) On-site threats. The UAS activity review process includes a review of Planned Safety to ensure that the RPIC is aware of potential risks and has procedures to mitigate risks.

Not all potential safety considerations may be applicable. Many risks associated with UAS activity can be mitigated by selecting operating locations where a UAS incident or accident would be unlikely to cause an injury.

10.2 Planned Safety

Planning for safety is an important aspect to UAS activity. Many RPICs have documented standard operating procedures that may be used to fulfill safety planning requirements.

Depending on the scenario, safety planning may include:

- Narrative of the proposed operation
- Flight altitudes
- Marking of buffer or safe-zones
- Specific flight paths
- Emergency procedures
- Identified emergency or contingency locations
- Crew management (including roles and responsibilities)
- Procedures to manage crowds or spectators

10.3 On-site Threats

There are many on-site threats to UAS safety that are not always feasible to be reviewed. It is the responsibility of the RPIC to ensure a safe operating environment, from ensuring the Unmanned Aircraft is suitable

for operation to managing intrusions and weather conditions.

Example On-site Threats

- Weather conditions
- Structures not visible from satellite imagery, such as
 - Powerlines or telephone poles
 - Recent construction
 - Temporary structures
- Intruding air traffic
- Intruding pedestrians or other non-participants
- Unmanned Aircraft damage
- Unplanned spectators or crowds

10.4 Safety Guidelines

- UAS activity should always establish a buffer or safe-zone between the Unmanned Aircraft and any non-participating persons or sensitive locations.
- A good rule-of-thumb is to maintain a buffer or safe-zone of roughly $\frac{1}{4}^{th}$ of the flight altitude.
- Visual Observers and supporting ground crew should be utilized when available.
- Supporting ground crew should assist in ensuring safety to all non-participating persons.
- High visibility reflective vests should be utilized when operating near roads or when near non-participants (Figure 10.1).
- Whistles are effective for alerts or other time-sensitive communication.
- Orange cones may be used to help communicate Unmanned Aircraft flight regions to non-participating persons, but are not fully sufficient.
- If spectators are expected, a supporting ground crew member should be tasked with preventing spectators from distracting the RPIC with questions or comments.
- When operating in uncontrolled locations in proximity to non-participating persons, extra care should be exercised. Specific flight paths and altitudes should be pre-planned such that potential gaps in buffer or safe-zones can be identified.
- When operating near roads, a supporting ground crew member should be tasked with being located near the road to monitor traffic, and if necessary, retrieve a fallen Unmanned Aircraft before it becomes a road hazard.
- When operating in fenced areas, operate exclusively within the fenced areas unless there is sufficient visibility on the other side to ensure safety to non-participants.
- Flying above buildings and structures minimizes risk to pedestrians, but it is recommended to contact the facility manager to explain the proposed operation and potential for risk.

10.5 Aerial Threats to UAS Activity

One of the biggest UAS safety concerns for the FAA is aircraft to aircraft strikes. While there have been only a handful of validated accidents between a UAS and manned aircraft, there many more documented near-misses, even within the UC system.

Detecting and avoiding aircraft is a four-stage process: detect, assess, decide, act. Each stage takes a non-insignificant amount of time.

Minimize the threat of aerial collisions by making sure you have enough time to get out of the way.



Figure 10.1: UAS operators with high visibility reflective vests

- Minimize the time it takes to detect a threat.
 - Constantly listen for potential incoming aircraft.
 - Bring a visual observer.
 - Everyone must be on task while the UAS is in operation. Minimize idle chat.
- Minimize the time it takes to assess a threat
 - Fly at low-altitudes and within close proximity to make it easier to judge whether an intruding aircraft may pose a threat.
 - Practice judging an intruding aircraft's location by sound.
 - Use visual scanning techniques to identify an aircraft's location quicker.
- Minimize the time it takes to decide on a course of action.
 - Pre-plan for evasive actions by identifying evasive action trajectories.
 - Know where emergency safe landing locations are.
- Minimize the time it takes to act.
 - Know how to disengage an automated flight plan.
 - Practice taking over and resolving an aerial threat.

10.6 UAS and Fire Safety

While UAS accidents and incidents involving fire are rare, they are a valid and significant concern. With the majority of UC UAS usage on field sites and other rural locations, the potential for the accidental sparking of fire is a concern. A fire sparked by a UAS can spread quickly (Figure 10.2) and with California's dry environment, can cause significant damage (Figure 10.3).

The most common cause of UAS related fire is from misuse of LiPo batteries. Special care should be taken when charging, discharging or storing LiPo batteries. If the internal polymer cell of a LiPo battery is exposed to air, a violent chemical reaction starts that could explode, but more commonly releases significant amounts



Figure 10.2: Beginning of a fire at Richmond Field Station, UC Berkeley



Figure 10.3: Post fire damage from UAS accident at Richmond Field Station, UC Berkeley

of smoke and heat that can ignite other fire fuel sources. A LiPo battery fire is typically caused by a physical puncture to the battery or from misuse, such as overcharging or electrical shorts.

In reviewing UAS activity, it is important that the RPIC is aware of the relevant fire dangers and plans for fire safety. Consult the appropriate department (Fire, Field Safety, EH&S) if there are concerns over fire risk. Minimize the potential for fire by monitoring where the UAS will be flying and ensure that if a fire was to occur, the RPIC and any other persons, such as Visual Observers, are prepared to respond appropriately.

Guidance for fire safety:

- Everyone should take a fire safety training course.
- Avoid flying on high fire risk days.
- Bring a fire extinguisher and a shovel/bucket of sand to field sites.
- Ensure that a crew member has easy access to fire equipment.
- Ensure that a crew member has easy access to reach any location where the Unmanned Aircraft may crash.
- Ensure that a crew member has the ability to report an emergency situation and can adequately provide directions for emergency personnel to reach the site.
- When flying in high fire risk locations, use high quality, commercially available Unmanned Aircraft with enclosed electronics.
- Never fly a damaged or swollen battery.

10.7 Community Input to Safety

Another pathway that is recommended to improving UAS safety is to acknowledge the demand for UAS activity and engaging with the campus community to ensure there is a functional pathway to meet the demand. When the pathway is too restrictive, non-compliance increases and in turn decreases overall safety. Chapter 14 provides examples of campus UAS groups.

Chapter 11

Academic Use of UAS

11.1 UAS Regulations for Academic Use

In Oct 2018, the FAA Reauthorization Act of 2018 was signed into law with two provisions significantly relevant for the University of California: Sec 349 - Exception for Limited Recreational Operations of Unmanned Aircraft and Sec 350 - Use of Unmanned Aircraft Systems at Institutions of Higher Education.

In Sec 350, Congress decreed that for the purposes of Sec 349, a recreational purpose shall include an unmanned aircraft system operated by an institution of higher education for educational or research purposes. The phrase ‘educational or research purposes’ includes

- Instruction of students at the institution
- Academic or research related uses of UAS that have been approved by the institution
- Activities undertaken by the institution as part of research projects
- Other academic activities approved by the institution

Given this wide definition, this provision is relevant to approximately 75% of the University of California’s UAS activity.

In Sec 349, Congress rewrote the statutes in the USC that was previously associated with ‘model aircraft’ use, now referred to as ‘Recreational Operations.’ To abide by the new ‘Recreational Operations’ statute, - The aircraft must be operated in accordance with or within the programming of a Community-Based Organization (CBO) - The aircraft must be flown within VLOS - The aircraft must be operated in a manner that does not interfere with and gives way to any manned aircraft - The operator must obtain prior approval from the FAA to operate within controlled airspace - The aircraft may not fly more than 400 ft above ground level in uncontrolled airspace outside of designated ‘fixed-sites’, and - The operator must pass an aeronautical knowledge and safety test, and maintains proof of passage to be available to the FAA and law enforcement.

The new statutes can be interpreted as stricter than the previous ‘Model Aircraft’ regulations, however, due to the inclusion of Sec 350, they offer a new and easier path forward for many University of California use. Previously, all research activity with UAS required a 14 CFR 107 Small Unmanned Aircraft System Remote Pilot Certificate (Drone License), which can be a challenging imposition in a 10 week quarter. The new regulations provide an alternative more suitable for introductory student UAS activity.

As of July 2019, the FAA has not finalized the implementation all aspects of Section 349. Currently, the aeronautical knowledge and safety exam has not been implemented. In the interim, the FAA is directing all ‘Recreational Operations’ to abide by their interim rules as described here: https://www.faa.gov/uas/recreational_fliers/

In the current interim rules, a UC student conducting academic activities may abide by the Recreational Operation regulations without a Drone License. Once the aeronautical knowledge

and safety test has been established, all students wishing to abide by the Recreational Operation regulations must complete the test before flying.

The application of the Policy still applies to the academic use of UAS, regardless of the regulations or statute that enables the UAS activity. All UAS activity subject to the Policy will require both a UAS Request Form and a UAS Post-Flight Report, and be compliant with all applicable regulations. Depending on the specific UAS activity, the Designated Local Authority or location specific policy or procedure may additionally opt to issue open or standing approval under specific conditions that are deemed to be of low or minor risk on the condition of compliance with regular submission of Post-Flight Reports.



Figure 11.1: Students flying UC-owned UAS for coursework on a University Location

11.2 Frequently Asked Questions

Which set of regulations do I fall under?

For any academic related activity, it depends on whether your operations fit within the Recreational Operations exemption, otherwise you default to abiding by 14 CFR 107 regulations. Keep in mind that the Recreational Operations exemptions mandates compliance with a CBO's safety guidelines which may have stricter restrictions than 14 CFR 107. But if the purpose is for the University, but not academic (example: Media & Communications, Facility Inspection), then you must abide by 14 CFR 107 regulations.

When doing an academic activity, which set of regulations is better?

There are advantages and disadvantages to both scenarios. In many cases, the new 'Recreational Operations' may be the fastest path forward for simple, rural flight operations. At the current time, academic UAS activities that plan on flying in certain controlled airspace areas, over occupied structures, within 25 ft of another person, or outside of a reasonably controlled flying site, should proceed with 14 CFR 107 regulations.

What are some of the airspace restrictions of 'Recreational Operations'?

Under 'Recreational Operations,' RPICs must obtain Airspace Authorization similar to 14 CFR 107 operators either through (ref:LAANC) or (ref:DroneZone). However, unlike 14 CFR 107 operators, recreational RPICs are prohibited from requesting airspace altitudes that exceed the published altitude limit in the FAA's (ref:facility_map). For example, at UC Santa Barbara, the Facility Map lists an allowable altitude of 0 ft AGL (effectively no flying) over the majority of campus. A licensed RPIC operating under 14 CFR 107

may request and be granted special authorization to fly up to 100 ft AGL. However, an unlicensed RPIC recreational operator would be prohibited from flying at all in the same location.

What will the new Aeronautical Knowledge and Safety Test be like? How much will it cost?

The FAA has not released details of the new test. However, it is anticipated that the test will be a shorter and simpler version of the 14 CFR 107 license exam, focusing on the bare minimum ‘rules of the road’ and safety guidance. It is anticipated to take less than 1 hour for a novice, and would include embedded training, no prior studying necessary. No information regarding the cost has been announced, but is expected to be minimal, if any.

What does the new regulations mean when it says ‘the programming of a Community-Based Organization’?

The regulations do not require you to be a member of a CBO but that you abide by the rules and safety guidelines of a community-based organization. While not yet officially recognized, the Academy of Model Aeronautics is one of the largest CBOs and have an extensive safety history for those that abide by their rules and safety guidelines (located here: <https://www.modelaircraft.org/sites/default/files/100.pdf>). These rules and safety guidelines often include prohibition on flying over people and buildings, limitations on suitable flying locations and specific standoff distances.

What does the new regulations mean when it says “The operator must obtain prior approval from the FAA to operate within controlled airspace”?

The FAA is mandating that all controlled airspace access requests for recreational operations be routed through the Low Altitude Authorization Notification Capability system (LAANC) and not by calling the local airport tower. The LAANC system can provide instantaneous authorization via a 3rd party application such as Airmap, KittyHawk, or UASideKick for flight requests below a certain altitude depending on your location.

I am planning to fly over a research site that is access controlled and the airspace is uncontrolled, do I need a Drone License?

Typically not. This common scenario (such as in Figure 11.1) will typically meet the necessary site requirements for Recreational Operations.

I am planning to fly along the beach to monitor coastal erosion, do I need a Drone License?

Unless the beach is to be closed to the public, this scenario will likely require a Drone License.

I am planning on flying in the campus quad to test a flight controller, do I need a Drone License?

If the airspace is uncontrolled (Class G), and the area within the campus quad is sufficiently cleared and closed to non-participants, then you do not need a Drone License. If you want to fly at UCI, UCSB or UCLA, then you will need to obtain an Airspce Authorization via LAANC.

I do not have a Drone License, can I do a coursework assignment on the use of drones in building inspections?

You may be able to do some flying without a drone license, however, you will not be allowed to fly over a building and must stay at least 25 ft from all non-participants, which may limit your ability to conduct effective analysis.

I am a graduate student Teaching Asssistant and I would like to teach my students how to fly a drone? Do I need a license? Do the students need a license?

If the site is sufficiently cleared and closed to non-participants, than everyone may have a chance to learn how to fly a drone without a drone license. However, additional safety precautions may be necessary.

What is a fixed-site?

A fixed-site is a location published by the FAA that recognizes that recreational activity may occur in that airspace. While the Academy of Model Aeronautics has obtained FAA recognition of fixed-sites, the FAA has not published information on the formation or requirements to have an area designated as one.

11.3 Personally-owned UAS used for Academic Research or Coursework

Some students, staff and faculty personally own UAS that they may wish to utilize for their respective activity.

Personally-owned UAS used for University Business such as research or teaching are subject to the UC's UAS Policy, and as such a UAS Request Form and a UAS Post-Flight Report must be completed. This use is allowed and may be provided free coverage under the UC's UAS liability insurance policy if it is properly documented and the UAS activity abides by the Policy. However, personally-owned UAS are not covered by the UC's Property Insurance policy - any damage to the UAS by theft, fire, in-transit or in-flight is not covered. Additionally, any UC-equipment attached to a personally-owned UAS is additionally not covered. It is strongly recommended that personal equipment is not used for University Business

Personnally-owned UAS used for coursework, such as senior projects or homework assignments are not subject to the Policy unless operated on a University Location. Additionally, they are not covered by either the UC's UAS liability insurance policy or the UC's Property Insurance policy. Students assume all risk and liability for their use.

Chapter 12

Common UAS Policy Considerations

12.1 Indoor Use

The use of UAS of all sizes indoors is included within the scope of the Policy. Any UAS operated exclusively indoors is still considered legally a UAS, as an aircraft is defined as any contrivance invented, used, or designed to navigate, or fly in, the air¹.

Though UAS that are operated exclusively indoors are exempt from FAA regulations, the Policy maintains oversight of indoor usage as their usage may still pose a safety risk, albeit easily mitigated.

Small UAS that weight less 0.55 lbs often pose little serious risk to persons, however, they may in rare situations cause property damage. One of the primary concerns of UAS of all sizes when operated indoors is damage to fire sprinklers. Mitigation may be accomplished by restricting usage to trained operators or by restricting usage within structures or implementing physical barriers to fragile items.

The Designated Local Authority or location specific policy or procedure may opt to issue specific restrictions or allowances on the use of UAS indoors. Specific flight information may not always be feasible, but should be reported when it is.

Example Statements for Indoor Use

- Student Clubs or classes must operate within a netted structure designed to prevent damage when operating indoors.
- No flying within dorms.
- Small UAS under 0.55 lbs may be operated indoors in a safe manner that minimizes risk to fire sprinklers.
- A laboratory hazard assessment must be conducted prior to any indoor UAS usage.
- Regular indoor UAS activity must submit estimated usage rates.

12.2 Recreational UAS Use

Recreational UAS, formerly known as ‘Model Aircraft’ is a popular past-time since the dawn of modern aviation, and previously their use has largely been unregulated. However, in recent years, the regulatory landscape has undergone several changes that may be confusing. In 2012, Congress put into law the definition of Model Aircraft and the Special Rule for Model Aircraft in Public Law 112-95 (Section @ref{ch-related-info}). The Special Rule was codified in 14 CFR 101 with the publication of 14 CFR 107, but prevented the FAA from promulgating further regulations. This was repealed 6 years later in the FAA Reauthorization Act of 2018 which removed the legal distinction of ‘Model Aircraft,’ and introduced new statutes within the

¹49 USC 40102

United States Code under the authority of the FAA. As of this writing, the FAA has not yet promulgated regulations however, they are enforcing some of the new statutes.

In the current implementation, the RPIC is exempt from 14 CFR 107 regulations (and Remote Pilot Certificate if the operator meets the required statutory conditions (See @ref() for details). In general, the UAS must be flown only for recreational purposes, must be flown with or within the programming of a CBO's safety guidelines (such as the Academy of Model Aeronautics), must only be flown within VLOS, must be flown in a manner that does not interfere with and gives way to any manned aircraft, must only be flown at altitudes less than 400 ft above the ground, and if in controlled airspace, the operator must obtain authorization. In most scenarios, recreational operations are more limited than licensed civil operations under 14 CFR 107.

Recreational UAS activity can be made safe and appropriate in large, open fields with limited opportunities for pedestrian intrusion. However, safety considerations arise when operating in small areas, or in the vicinity of people. It is important to note that under the Academy of Model Aeronautics safety code, recreational UAS must remain a minimum of 25 ft from all persons (or further depending on the context), with the exception of the RPIC.

The use of recreational use of UAS is within the scope of the Policy to review. This enables the location specific policy or procedure or Designated Local Authority to issue restrictions or allowances on recreational UAS at a University Location. This includes open or standing approvals in specific activities that are deemed to be of low or minor risk, when appropriate procedures are implemented and abided.

Some example recreational UAS policies or procedures statements that can be considered or utilized:

- A student club that wishes to hold a Recreational UAS club activity must submit safety documentation and reserve the appropriate space.
- Recreational UAS activity is allowed at specific campus fields for any UC-affiliate who completes an online webinar that instructs on campus-specific policies and safety guidance.
- Recreational UAS activity is prohibited within 100 ft of residential areas without prior approval.
- Recreational UAS activity is prohibited during major campus events or ceremonies

It is recommended that the policies or procedures for recreational UAS include consultation with expected users and include student groups.

12.3 Non-University Business Use

All UAS activity on or within the property owned or managed by the UC must be approved before commencing. This includes when Non-University Business occurs at a University Location.

Some common instances of Non-University Business Use

- 3rd Party visitors to University Location.
- 3rd Party hired by UC to perform a service.
- A student or group of students providing a service.

The review process described in Chapter 5 remains the same. However, since they are not acting on behalf of the Regents of the University of California, they must obtain their own liability insurance and are responsible for obtaining any necessary authorization for regulatory compliance.

For departments or groups who may wish to use a UAS at a very infrequent rate, it may be more advisable to utilize an existing UC affiliated RPIC rather than hiring a 3rd Party operators.

A common scenario is found at a University Location in controlled airspace (Non-Class G airspace). The Systemwide Designated UAS Authority has obtained Airspace Authorizations for many such locations, however it is not transferable to non-University Business Use. For example, if a researcher hires a RPIC for UAS activity at a research site within a military controlled airspace, the 3rd Party RPIC must obtain their own Airspace Authorization. This also applies to students who perform a commercial service at a University Location. Even though the student is a UC student, the student's purpose is not University Business and thus falls into Non-University Business Use.

Compliance with FAA regulations have improved since the enactment of 14 CFR 107 regulations, however, be mindful that hired 3rd Party operators are often unfamiliar with the cadence and activity of a university campus, especially around classrooms and residential dorms. The Designated Local Authority is often in the best position to advise 3rd Party operators when areas may be safe or unsafe.

Liability insurance is another common issue for 3rd Party operators. It is important to note that Aviation/UAS liability insurance is not a common rider for general or commercial liability policies, and without it, the insurance company will not pay out for any damages caused by a UAS. In most situations, Aviation/UAS liability insurance coverage must be purchased separately. It is important for the Campus Risk Manager to vet or evaluate whether the 3rd Party has the appropriate coverage.

12.4 Emergency or First Responder Use of UAS

The Policy states that the operation of UAS by emergency first responders may be exempt from the policy based on determination of emergency needs. First responders should refer to their internal department protocols. However, the Systemwide Designated UAS Authority is available to assist in the development of first responder protocols for UAS usage.

The use of UAS is on the rise nation-wide as their potential for saving lives are realized - providing aerial views for search & rescue, monitoring for mudslides or other hazardous situations. First responders may operate under as a PAO (if a public agency, such as law enforcement) or under 14 CFR 107. All rules and regulations are applicable. Additional regulatory flexibility is provided through the FAA's Special Governmental Interest (SGI) process (FAA Order JO 7200.23A).

12.4.1 Special Governmental Interest Process

Through its SGI process, the FAA may expedite the issuance to qualifying UAS operations of 1) addendums to pre-existing [COAs] or 2) Airspace Authorizations and Airspace Waivers to 14 CFR 107 operators.

The FAA may rapidly approve through its SGI process COA addendums and 14 CFR 107 authorizations and waivers UAS operations that:

- Fly in airspace (including controlled airspace and disaster TFRs) and/or at altitudes not otherwise permitted.
- Fly BVLOS.
- Fly at night.

Obtaining approval through the SGI process

1. You must already be an existing 14 CFR 107 RPIC with a current certificate OR you must have an existing COA. The FAA will not grant emergency approval for casual or recreational drone pilots.
2. Fill out the Emergency Operation Request Form (MS Word) and send to the FAA's System Operations Support Center (SOSC) at 9-ator-hq-sosc@faa.gov.
3. If the proposed UAS flight is to be conducted within a disaster TFR, the FAA's SOSC, as appropriate, may need to pre-coordinate the requested operation with a responsible Incident Commander or Unified Command (IC/UC) to ensure their activity will support or, at a minimum, not interfere with broader response and recover efforts.

The FAA will then coordinate with the effected Air Traffic facilities to:

1. Review your proposed operation and determine whether it meets the necessary criteria for emergency approval.
2. Implement any necessary mitigations to minimize impact on other air traffic operations.
3. Contact you within one hour or sooner regarding the status of your request or to request additional information.

If approved, the FAA will add an amendment to your existing COA or Remote Pilot Certificate that authorizes you to fly under certain conditions for the specified operation.

If denied, operators should NOT fly outside the provisions of their existing COA or 14 CFR 107. Operators have the option to amend their requests.

12.5 International Students, Visiting Scholars and Undocumented Students

The UC attracts students, staff and faculty from all around the world. This unfortunately can complicate the already complex UAS regulatory environment. There are two issues: 1) obtaining a 14 CFR 107 Remote Pilot Certificate and 2) operating under 14 CFR 107. It is possible for it to be legal for a foreign national to obtain a 14 CFR 107 Remote Pilot Certificate but not be eligible to use it for a specific purpose.

12.5.1 Eligibility for a 14 CFR 107 Remote Pilot Certificate

The Remote Pilot Certificate does not require U.S. citizenship.

Requirements

- Be at least 16 years of age
- Be able to read, speak and understand the English language. If the applicant is unable to meet one of these requirements due to medical reasons, the FAA may place such operation limitations on that applicant's certificate as are necessary for the safe operation of the small unmanned aircraft.
- Not know or have reason to know that he or she has a physical or mental condition that would interfere with the safe operation of a small unmanned aircraft system.

However, to take the FAA Airman Knowledge Exam, the proponent must prove their identity with a valid photo ID that includes their date of birth, signature and physical, residential address.

For U.S. Citizens and U.S. Resident Aliens, this may be accomplished with one of the following:

- Driver Permit or License issued by a U.S. state or territory
- U.S. Government Identification Card
- U.S. Military Identification Card
- Passport
- Alien Residency Card

For Non-U.S. Citizens, this may be accomplished with one of the following:

- Passport and a Driver permit or license issued by a U.S. state or territory.
- Passport and an Identification card issued by any governmental entity.

12.5.2 Foreign Nationals operating an sUAS

While a foreign national is permitted to obtain a Remote Pilot Certificate, there are additional federal regulations that apply, and in some cases, certain activity requires additional permitting or may be prohibited completely. Under federal law, an aircraft operated by a foreign national in civil airspace is generally considered a foreign registered aircraft and is subject to regulations found in 14 CFR 375.

It is important to note that this restriction applies only for UAS and sUAS for non-recreational activity. Any use under recreational operations, such as individual recreation, club recreation or approved academic activity, is not subject to 14 CFR 375 restrictions.

How this applies:

- An international student with a Remote Pilot Certificate may operate a UC-owned sUAS for specific University Business.
- An international student with a Remote Pilot Certificate may not operate a personally-owned sUAS for University Business or for other non-recreational activity without a 14 CFR 375 permit.
- An international student may conduct recreational UAS activity for personal recreation

12.5. INTERNATIONAL STUDENTS, VISITING SCHOLARS AND UNDOCUMENTED STUDENTS55

- An international student may conduct recreational UAS activity for a classroom homework assignment, senior project, or approved academic activity, including research.

###Undocumented Students The University of California is home to many undocumented students, including those enrolled in Deferred Action for Childhood Arrivals (DACA). The University of California is steadfast in ensuring the education of all students admitted into the UC regardless of their immigration status². This section addresses the UAS restrictions and opportunities for undocumented students.

Unfortunately, since the Remote Pilot Certificate is a federal certificate, it requires a federally recognized identification. Statewide initiatives such as AB60 Driver's Licenses are not valid as identification for the FAA Airman Knowledge Exam.

Students with a DACA identification card are eligible to take the FAA Airman Knowledge Exam. For the purposes of Part 107, they are not considered foreign nationals and may operate under Part 107.

It is important to note that there are three alternative solutions for undocumented students to utilize UAS in their education.

- Undocumented students are not restricted to operate recreational UAS operations. This applies to the use of UAS for individual recreation, club recreation or for approved academic activities such as coursework, senior projects or academic research.
- Undocumented students are not restricted to operate UAS in indoor facilities, such as outdoor drone cages or inside UC buildings. Undocumented students may engage in UAS related research in any location where FAA regulations are not applicable.
- For outdoor usage, if a licensed UAS operation is necessary, undocumented students may be in control of a UAS if and only if the student is under the direct supervision of a licensed RPIC and the RPIC has the ability to immediately take direct control of the flight of the sUAS.

²<https://universityofcalifornia.edu/press-room/uc-president-napolitano-statement-decision-end-daca-program>

Chapter 13

Services Available

13.1 UC Drones Web Application

UC Risk and Safety Solutions launched an organizational tool called UC Drones to help track UC-owned Unmanned Aircraft, review and approve UAS activity (Figure 13.1. It can be found at <http://ehs.ucop.edu> as part of the UC Risk and Safety suite of web applications.

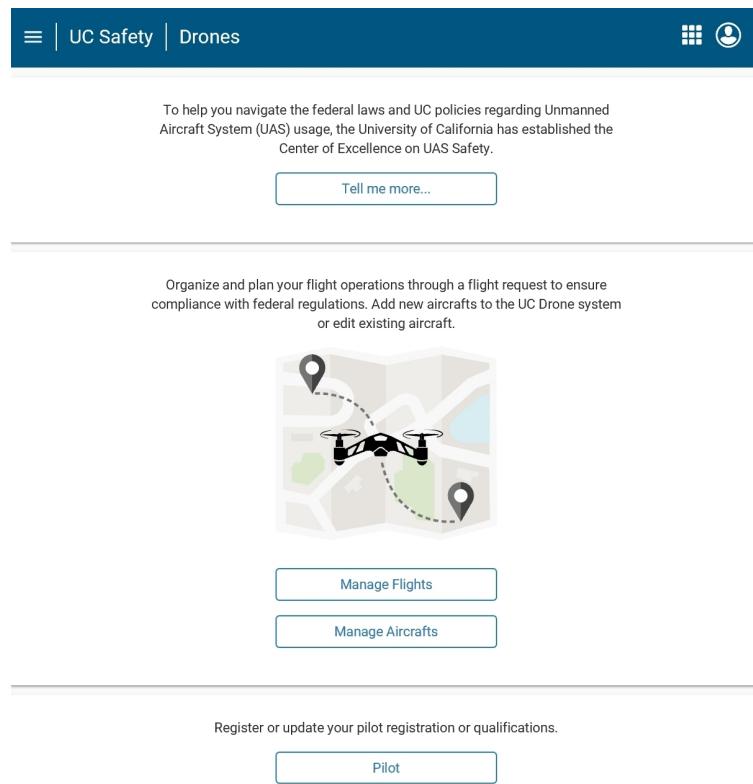


Figure 13.1: UC Drones

The use of UC Drones is encouraged, but not mandatory. A University Location may opt to utilize UC Drones or develop their own solution for the management of UAS records, flight authorizations and flight records.

A Designated Local Authority may utilize UC Drones as means to funnel UAS operation requests, provide notification, grant authorization and document flight activities. UC Drones is expected to continue to release additional features as requested. Future enhancement include automated risk assessments and approvals for low-risk activity, real-time weather and airspace assessments and integration with FAA systems.

13.2 Filing of FAA Authorizations

The Systemwide Designated UAS Authority is available to assist in the filing of FAA required authorizations. This includes

- Airspace Authorization for UAS activity in controlled airspace
- Airspace Waiver for UAS activity not allowed with an Airspace Authorization
- Waiver under 14 CFR 107.200. Commonly includes authorizations for night-time operations, flight altitudes above 400 ft AGL or multiple aircraft.
- PAO COA for UAS activity that meets the criteria of a PAO
- Registering of Unmanned Aircraft used in foreign nations that require 14 CFR 47 registration.

13.3 UAS Training and Certification

The Systemwide Designated UAS Authority supports the development of local UAS training programs and support programs. Material may be provided upon request. In addition, the Systemwide Designated UAS Authority is developing specialized training and certification programs for uncommon scenarios.

Current Training Modules Available

- UC Night-flying Training
- Flight Operations over People
- Visual Observer
- Advanced UAS Training

Chapter 14

Campus Drone Groups

As campuses grow into their UAS usage, it may be advisable to develop and institute ‘drone’ groups. Community involvement is an effective means to disseminate knowledge and establish a safety program. Below are some examples of groups - there are no requirements or restrictions for the formation of any of these groups or of any of the example tasks.

14.1 UAS Campus Policy or Procedure Group

The Policy allows for a University Location to appoint a Designated Local Authority. As a University Location may see fit and in accordance to their University Location policy, the University Location may organize a working group or committee to develop University Location specific policy or procedures. See Chapter 2 for further information regarding University Location jurisdiction and authority.

Example Tasks

- Develop or advise location specific policy or procedure.
- Review efficiency and compliance of campus UAS activity.
- Review high risk or other significant unique UAS activity.
- Develop streamlined procedures for low-risk UAS activity.
- Standards regarding privacy.

14.2 UAS Campus Safety Group

Another valuable group is a University Location is a safety group. In contrast to a Policy or Procedure group, a safety group would provide safety training and assist in UAS activity development and planning.

Example Tasks

- Provide UAS training to the campus.
- Develop Standard Operating Procedures for common UAS activity.
- Promote UAS safety to the campus.
- Identify and manage safe locations for UAS activity.

14.3 UAS Campus Service or Advocacy Group

Many UC students and researchers have significant experience in the use and operation of UAS. It would be advantageous to leverage this knowledge and experience by providing opportunities for UAS users to interact on a regular basis with the campus. This may come in the form of a service center or other advocacy group.

Example Tasks

- Provide UAS activity as a service.
- Encourage innovative UAS activity.
- Organize or support UAS activity by student clubs.
- Hold UAS-related events to provide networking and community building.

Chapter 15

Enforcement or Restrictions for UAS

The growth of UAS on our UC campuses has also led to rising concerns over inappropriate UAS usage. This Chapter provides guidance on the enforcement of the Policy and campus responses.

15.1 Enforcement and Safety

It is important to note that while the Policy seeks to improve UAS safety by providing oversight, overuse of UAS restrictions may be counter productive.

In conjunction with positive means for advocating for UAS safety, there is a role for enforcement of the Policy. The decision to approve or deny UAS activity should not be taken lightly. The best outcome for a complicated scenario should be a discussion of safety concerns and mitigation strategies. However, there will be cases when a formal denial declaration is necessary and a template is provided in Chapter 23.

15.2 Appropriate Reasons to Restrict UAS usage

While the Policy states that the UAS activity must be reviewed for specific compliance issues, a Designated Local Authority may also review for impacts to University Business and other local issues. Ultimately, there may be additional reasons to restrict UAS usage unrelated to legal compliance. Below are some recommendations for a non-exclusive list of appropriate reasons to restrict UAS usage as well as some reasons that may be overly cautious.

Appropriate Reasons

- Proximity to Medical Helipads
- Privacy concerns within 100 ft distance
- Expected heavy pedestrian or vehicular traffic at the date/time of UAS activity
- Impacts to wildlife
- Detrimental to University Business
- Lack of planning or safety mitigations

Overly Cautious Reasons

- Privacy concerns at distances greater than 100 ft
- Noise concerns at distances greater than 200 ft
- Pedestrian safety when campus activity is non-existent
- Requiring advanced training in low risk locations
- Risk of damage to outdoor sports equipment or facilities with UAS under 4.4 lbs

15.3 Unauthorized use of UAS on a University Location

Depending on the situation, there are several different approaches. The primary response should be education rather than punishment. Below are four example situations and an appropriate response.

- If there's an immediate and evident safety threat (maliciously endangering others, reckless behavior, etc), call local law enforcement.
- If the operation of a drone is impeding University Business such as disrupting an event or preventing authorized UAS activity, ask the person to stop and to leave. If they refuse, then it may be considered trespass and contact local law enforcement.
- If no one is at immediate risk, the UAS activity is not impeding University Business, but the UAS activity is likely a violation of an applicable federal, state or local regulation, ask the operator to stop and point out the violation. If the operator persists, collect information, and report to the Systemwide Designated UAS Authority.
- If the only violation is that the UAS activity was not requested or approved (everything is legal, safe and its not interrupting anything), ask them to stop, inform them of the policy, and the reason of the policy. Law enforcement action is not advisable, however, the situation may be documented and administrative action may be taken, if appropriate.

15.4 Common Arguments and Potential Counters

Occasionally a UAS operator may disagree with the review or potential enforcement action. In many cases, the disagreement may stem from a misunderstanding of regulations or miscommunication of policy. The following lists some common arguments and a response to clarify the underlying misunderstanding.

Argument: Only the FAA may create airspace regulations

The campus is not creating airspace regulations. It has a policy on where a person may or may not operate a UAS, model aircraft or drone. While on campus property, a person may not operate a UAS without prior approval. The FAA claims sole jurisdiction of the airspace and overflight¹, but laws and policies such as land-use, zone, privacy and trespass are not subject to Federal Regulation².

Argument: This area is open to the public, why can't I fly my drone here?

While the University of California is a public agency, this does not mean that its property is not managed. The University has a responsibility to ensure the safety and security of everyone³. In order to manage the property, the campus has established that a person may not operate a UAS without prior approval.

Argument: I'm operating as a hobbyist, there are no regulations

Hobbyist operators are subject to Exception for Recreational UAS statutes introduced by the FAA Reauthorization Act of 2018. In addition, UAS regulations do not supersede land-use, trespass or privacy regulations. The campus has put into policy that while on campus property, a person may not operate a UAS or drone without prior approval.

Argument: This is a toy, not a Drone

Congress has defined Unmanned Aircraft as any aircraft that is operated without the possibility of direct human intervention from within or on the aircraft. This definition has no size or weight limit. While the operator may be using the Unmanned Aircraft as a toy, it however is regulated as above. Even though Unmanned Aircraft under 0.55 lbs do not require registration, they are not exempt from regulation.

Argument: I have legal authorization from the FAA to fly here

A licensed sUAS operator may have permission to use the airspace, but the campus still has jurisdiction to create policy on where a person may or may not operate a drone on campus property. The FAA makes

¹49 U.S.C. 40103(b)

²pg. 42194, Federal Register, Vol. 81, No 124

³UCOP Policy PACAOS-40.00 Policy on Use of University Properties

it clear that an Airspace Authorization or Airspace Waiver does not grant physical property access rights. Under ‘Standard Provisions’ of an Airspace Authorization or Airspace Waiver, there is a line that states ‘Note - This certificate constitutes a waiver of those Federal Rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.’

Argument: I'm not causing any problems

The campus has the jurisdiction to determine what is appropriate use of its facilities⁴. If a person is causing legitimate concerns on campus safety, campus security, privacy or interfering with University Business, that person is not using campus facilities appropriately.

⁴UCOP Policy PACAOS-40.00 Policy on Use of University Properties

Chapter 16

Best Practices for UAS Privacy

In the United States today, the use of UAS for both recreation and commercial use are becoming ever more prominent. UAS may be used for a variety of applications, including photography and videography. The capture and use of photographs and videos from a UAS platform raises new concerns on the rights, privacies, and permissions that involve both the operators of UAS and individuals that are uninvolved in the operation. The University of California recognizes the important value of privacy and strives to achieve an appropriate balance ensuring an appropriate level of privacy, nurturing an environment of openness, honoring its obligation as a public institution to remain transparent while safe guarding information about individuals.

Best Practices

- **Do Not** use a UAS to monitor or record activities where there is a reasonable expectation of privacy.
- **Do Not** use a UAS for unapproved recordings of any campus events or performances, or for any unlawful purposes.
- **Do Not** fly a UAS over private property without prior approval.
- **Do Not** use a UAS to harass people or intentionally disrupt events
- **Do Not** use a UAS for the specific purpose of persistent and continuous collection of identifiable data about individuals without the consent of the data subjects.
- **Do Not** retain identifiable data longer than reasonably necessary to fulfill a purpose.
- **Do Not** knowingly publicly disclose data collected with a UAS without undertaking a reasonable effort to obfuscate or de-identify identifiable data unless the data subjects provide specific consent to the disclosure.
- **Do** make a reasonable effort to provide prior notice to individuals of the general timeframe and area that they may anticipate a UAS intentionally collecting data.
- **Do** establish and make available a Privacy Policy for UAS data if the UAS may intentionally or unintentionally collected identifiable data. The policy should be appropriate to the size and complexity of the data collected.
- **Do** be considerate of other people's concerns over privacy, security and safety.
- **Do** contact the Office of Research Compliance and Integrity if identifiable data is to be used for human-subject research.
- **Do** take steps to ensure the security of any identifiable data.

Chapter 17

Frequently Asked Questions

This is a list of Frequently Asked Questions related to the Policy and its implementation.

A short list of Frequently Asked Questions for end-users can be found at: <https://www.ucop.edu/safety-and-loss-prevention/environmental/program-resources/unmanned-aircraft-systems-safety.html>

17.1 Scope of the Policy

- **Why is oversight necessary?**

There are many arguments for the UC to mandate oversight; not all of them may be applicable for every situation but collectively form sufficient justification. The UC has an obligation to be fully compliant with all applicable regulations. In some cases, there are specific regulatory compliance obligations to meet. In other cases, the UC's UAS insurance has compliance obligations. There are many concerns over the usage of UAS on-campus from a public safety and privacy perspective. In other cases, there are arguments that UC business use should be able to take priority over 3rd Party use. None of these determinations can be made unless there is a mechanism to screen for issues. It must be noted that the Policy does not prohibit procedures to ensure an alternative means of compliance.

- **The FAA has already created UAS regulations. Why is the Policy necessary?**

The FAA has sole jurisdiction of the airspace and overflight, however this is also the extent of their jurisdiction. The FAA regulations do not address other regulatory compliance issues such as export control, privacy, trespass harassment of wildlife or other land-use issues. The FAA regulations also do not address the prioritization of University Business or other campus policies on commercial use or filming. In addition, FAA regulations regarding UAS are in flux and may change with acts of Congress, court cases and through traditional rule making processes. Incorrect interpretations of UAS regulations is common. The Policy enables oversight to ensure compliance while regulations are in flux.

- **Does this policy apply to balloons and/or rockets?**

The policy does not apply to balloons or rockets.

- **Does the policy apply to international UAS activity?**

Yes, the policy applies to international UAS activity. The policy requires that UAS activity must comply with all applicable regulations; in the case of international locations, the applicable regulations would be the local regulations of the international site. To the extent that safety practices or best practices may differ internationally, the UAS activity should be reviewed on a case-by-case basis.

- **Is possession of a Remote Pilot Certificate sufficient for approval for UAS activity?**

The Remote Pilot Certificate is an indication that the RPIC passed a knowledge exam. It does not attest to the quality of the RPIC's experience with flying UAS or the RPIC's knowledge of safety practices. By itself, the Remote Pilot Certificate is not sufficient in all cases. However, where UAS activity risk is mitigated through other means such as remote location, or while operating a low risk Unmanned Aircraft, simply having earned the Remote Pilot Certificate may be sufficient.

- **What would happen if there's a disagreement between the Designated Local Authority and the Systemwide Designated UAS Authority?**

In most cases, if a Designated Local Authority is appointed, the Designated Local Authority would adjudicate the final ruling. If there is a question over regulatory compliance, the Systemwide Designated UAS Authority and General Counsel would adjudicate clarification over the regulatory compliance aspect.

- **What are the consequences of failing to abide by policy?**

Existing policies address non-compliance. On how enforcement action is to be handled (as directed at a system level) for policy violations, please refer to PACAOS 100.00 for students, PPSM 62-65 for staff, APM 015-016 for faculty, and APM 140,150 for non-senate academic appointees.

17.2 Requesting a UAS Flight

- **What information is required for a Flight Request?**

The policy states that the request must provide sufficient information to complete the review requirements on 'Compliance with applicable regulations and policies, impacts to public safety, impacts to privacy, impacts to civil rights and civil liberties and compliance with insurance requirements.' Of note, the policy does not mandate submitting a precise date/time of flight in all cases, but there are several cases where it may be necessary.

- **Does the policy require a 14-day lead time per flight?**

The policy does not require a 14-day lead time per flight. The policy requires that UAS activity requires prior approval (which must be reviewed within 14 days), but does not place a pre-defined requirement for advance notice nor does it limit the terms and conditions of an approval. As described in Chapter 5, a researcher may be granted standing approval to operate a designated location under a set of agreed upon terms and conditions.

- **Does the policy require each individual flight to go through an approval process?**

No. The Policy mandates that a UAS Request Form be submitted and reviewed in advanced of UAS activity. This may cover one flight, a set of flights, or a years' worth of flight. Unfortunately, it is difficult to assign a definition of the scope of a UAS 'activity' – such a definition may be tied to regulatory issues, safety issues, or even scheduling issues.

- **What if the weather is unsatisfactory during an approved 'window'?**

It is recommended that the terms of approval include procedures to address contingencies such as rescheduling. In situations where changes to a specified time window has no effect on coordination or safety, there may be no need to resubmit or require a second review. However, there may be situations where scheduling may be necessary.

- **Is the UAS Advisory Board needed to provide a blanket approval?**

The UAS Advisory Board is intended to address systemwide issues and policy exceptions rather than campus-level decisions. The Policy explicitly allows for a Designated Local Authority to grant recurrent or standing approvals.

- **May a Designated Local Authority require only a \$1Mil aviation liability coverage for a 3rd party user?**

It is recommended that all 3rd party UAS activity is covered under a \$5Mil aviation liability insurance policy. A local Designated Local Authority may opt to reduce the minimum coverage requirements with consultation from local Risk Services.

- **I am an international student. What am I allowed to do?**

An international student is eligible to obtain a Part 107 Remote Pilot Certificate. However, any aircraft operated by a foreign national is considered a foreign aircraft and is subject to 14 CFR 375 permitting requirements. There are a few exemptions - a common notable one is that if the UAS is registered to the Regents of the University of California, it is flown for University Business and the operator is employed by the UC, then the operation is exempt from a 14 CFR 375 permit. The UC Center of Excellence on UAS Safety can assist in determining the exact requirements of the operation and whether a 14 CFR 375 permit is required.

17.3 Oversight of the Policy and Future Policies

- **What mechanisms are in place to monitor the Policy?**

The Policy calls for a UAS Advisory Board to continue the development of future UAS policies, evaluating the effectiveness of systemwide policies and safety metrics. The reporting and recording requirement of the policy is intended to be able to provide the UAS Advisory Board with relevant performance information.

- **What mechanisms are in place to ensure that the campuses develop effective and efficient processes and procedures?**

The Policy mandates that the Systemwide Designated UAS Authority provide a forum to communicate and share UAS related information and best practices, and coordinate the development of University UAS policies through taskforces or working groups.

- **Can this policy be changed or how would future policies be developed?**

The Policy calls for a UAS Advisory Board to continue the development of future UAS policies, evaluating the effectiveness of systemwide policies and safety metrics. The UAS Advisory Board will be the starting point for recommendations for changes to the Policy and future policy development.

- **What will the UAS Advisory Board discuss?**

The UAS Advisory Board is expected to review the performance of the Policy and make recommendations for policy refinement and improvement. It may be tasked to generate a report on the status and use of UAS in the UC, address challenges related to new regulations on overflight of people or on the use of UAS delivery services to, from and within the UC. As UAS technology and regulations change, the UAS Advisory Board is intended to provide a steering guide to keep the UC compliant and competitive.

Chapter 18

Cybersecurity Concerns

The use of an unmanned aircraft system (UAS) designed, manufactured, or supplied by foreign companies could create increased cybersecurity risks and opportunities for network exploitation and collection by foreign threat actors.

18.1 Cybersecurity Risk

Potential security risks can arise when UAS manufacturers require users to register online and agree to store sensitive data on overseas or even domestic computer servers. These servers are typically maintained by the manufacturers, but can be accessed by third-party application vendors. In addition, online services offered by UAS manufacturers could create opportunities for the theft or seizure of sensitive information and the monitoring of user activities. Foreign threat actors could exploit:

- Flight log data, including information about network layouts and the locations of inspections and critical assets;
- Organizations' computer network data and systems;
- Images or recordings captured during flights, including physical security assets, vulnerabilities, and transportation networks;
- Corporate proprietary information or intellectual property;
- LE-sensitive information;
- Sensor data collected during critical infrastructure inspections;
- Emergency response operations and mission-planning information;
- Sensitive facility locations and assets; and
- Customers' personally identifiable information (PII).

18.2 Mitigation Strategies

Here are a couple of suggestions to reduce the potential data risks and vulnerabilities associated with UAS use and mitigate the loss of sensitive information.

- During initial UAS activation, use a department or lab name, email address, and password to reduce a UAS manufacturer's ability to track the owner/user through association with this identifier. Note: It should be assumed that the current GPS location will be transmitted during UAS activation, which could reveal the true owner.
- Use a new mobile device without a SIM card installed or set up previously and never used for other activities for that will contain limited to no PII collectable by a foreign UAS company. For previously used devices, performing a wipe and factory reset of the mobile device prior to using it as a controller is advisable.

- Periodically wipe or clear sensitive data from the system, including information stored on onboard or removable digital storage devices—such as SD and memory cards—and on connected flight controllers and mobile devices. Sensitive data should also be cleared before returning borrowed or rented UASs.
- Avoid connecting the UAS to internal or private networks with sensitive data. Use a known secured network to register the UAS, and use a local backup device to store footage and data.
- Before applying UAS patches and upgrades, consider their impact on operations.
- Review user agreements to verify who has access to data collected by the UAS.
- Inquire or review user agreements for information about third-party access to UAS data.
- Maintain awareness of third-party collection and retention of data collected during UAS operations and develop appropriate policies to ensure the protection of intellectual property and sensitive operations.

Chapter 19

Risk Scoring for UC UAS activity

This Risk Score has been developed to gauge the level of risk and and recommend requirements to enable the proposed UAS activity. These are recommendations and guidelines, rather than strict requirements - please utilize your best judgement.

Instructions: Select the Risk Score that best matches the proposed. Significant variation of descriptions may indicate further information or modification to activity is required.

Risk Level 1 - Minor Risk

Description: Generally safe activity. UAS activity in an access controlled area with no airspace issues or hazards. RPIC has sufficient experience and the UAS is in working condition.

Example: Student researcher conducting UAS flights for environmental research in a UC NRS site in an area with no known hazards or environmental impacts.

RPIC Experience: RPIC has sufficient experience and is comfortable with the UAS. Specialized training or significant experience is not required.

Unmanned Aircraft System: Any commercial or well-tested UAS in working condition.

Location: Any location that is relatively secured by either access control or obscurity.

Hazards: Few if any visual obstructions. Acceptable level of risk to objects on the ground. No significant fire risks. No environmental impacts.

Airspace: Class G airspace with minimal if any airspace traffic.

Recommend Safety Requirements: No additional requirements.

Risk Level 2 - Low Risk

Description: Some risks to location or property, but significant damage is remote or unlikely. In general, most flight activity would be Risk Level 2 unless the conditions for Risk Level 1 are met.

Example: New student learning to operate a UAS or flight operations in areas that are not completely access controlled.

RPIC Experience: RPIC has sufficient experience and is comfortable with the UAS. Specialized training or significant experience is not required.

Unmanned Aircraft System: Any commercial or well-tested UAS in working condition.

Location: Any location that is relatively secured by either access control or obscurity.

Hazards: Few if any visual obstructions. Acceptable level of risk to objects on the ground. No significant fire risks. No environmental impacts.

Airspace: Class G airspace with minimal if any airspace traffic.

Recommend Safety Requirements: No additional requirements.

Risk Level 3 - Escalated Risk

Description: Some risks to non-participants or other hazards, with some possibility of significant damage.

Example: On-campus UAS activity by campus media teams in somewhat segregated locations. Research activity near major highways or adjacent to suburban areas.

RPIC Experience: RPIC must have documented experience to allow any UAS activity in Risk Level 3 or higher.

Unmanned Aircraft System: Any commercial or well-tested UAS in working condition.

Location: May be in an unsecured location in the occasional proximity of non-participants.

Hazards: May include some ground hazards or visual obstructions.

Airspace: Class G airspace or in controlled airspace as permitted under FAA Facility Maps.

Recommend Safety Requirements: Visual observers are generally required for Risk Level 3 and above. May require the use of high-visibility reflective vests and/or communication protocols. May require a crowd safety plan.

Risk Level 4 - Moderate Risk

Description: Poses risks to others and sensitive property. Significant hazards with potentially catastrophic results, including privacy or legal issues.

Example: UAS activity in dense urban locations or areas of significant aviation traffic. Filming of crowds or major events in close proximity to non-participants.

RPIC Experience: RPIC must have significant documented experience. May require additional or specialized training or experience.

Unmanned Aircraft System: Any commercial or well-tested UAS in working condition.

Location: May be in areas with operational areas in close proximity to non-participants.

Hazards: May have numerous obstructions or ground hazards.

Airspace: May require special airspace authorizations or waivers. Flight altitudes in excess of allowable flight altitudes as listed under FAA Facility Maps.

Recommend Safety Requirements: Visual observers and additional ground support crew may be necessary. Documented safety plans should be comprehensive to address a multitude of potential scenarios.

Risk Level 5 - High Risk

Description: Significant risks are involved and may require special exemptions and authorizations for safety issues from the FAA or other regulatory agencies.

Example: Flight operations over people or in military airspace.

RPIC Experience: RPIC has significant documented experience and meets any extra requirements.

Unmanned Aircraft System: May require additional safety features such as parachutes or transponders to meet exemption or authorization requirements.

Location: Any location.

Hazards: May have significant hazards.

Airspace: May include airspace with special restrictions.

Recommend Safety Requirements: Significant safety planning will be necessary.

Chapter 20

FAA Risk Hazard Analysis

The FAA is regularly revising their UAS Risk and Hazard analysis scoring methods. A recent report published the following risk matrix (Figure 20.1). The FAA defines safety risk as the composite of predicted severity and likelihood of the potential effect of a hazard.

Figure 7: The Federal Aviation Administration's (FAA) Air Traffic Organization's Criteria for Acceptability of Safety Risks Posed by Unmanned Aircraft Systems (UAS)

Likelihood of risk	Severity of risk				
	Minimal ^a	Minor ^b	Major ^c	Hazardous ^d	Catastrophic ^e
Frequent At least once per week	Green	Yellow	Red	Red	Red
Probable Less than once per week and at least once per 3 months	Green	Yellow	Red	Red	Red
Remote Less than once per 3 months and at least once per 3 years	Green	Yellow	Yellow	Red	Red
Extremely remote Less than once per 3 years and at least once per 30 years	Green	Green	Yellow	Yellow	Red
Extremely improbable Less than once per 30 years	Green	Green	Green	Yellow	Yellow

The risk level is "low," meaning the risk is acceptable without any mitigation

The risk level is "medium," meaning the risk is acceptable, although mitigation is recommended

The risk level is "high," meaning the risk is unacceptable unless it is mitigated to a level of "low" or "medium"

Source: GAO presentation of Federal Aviation Administration information. | GAO-18-110

Figure 20.1: Recently Published Risk Matrix from the FAA

20.1 Hazard Severity

The FAA defines severity as the consequence or impact of a hazard's effect or outcome in terms of degree of loss or harm.

- Minimal severity refers to outcomes in which a UAS causes discomfort to those on the ground.

- Minor severity refers to outcomes in which a UAS causes non-serious injury to three or fewer people on the ground.
- Major severity refers to outcomes in which
 - a UAS causes non-serious injury to more than three people on the ground;
 - a UAS crew experiences a reduced ability to cope with adverse operating conditions to the extent that there would be a significant reduction in safety margins; or
 - a UAS causes a manned aircraft to make an evasive maneuver, but the UAS and the manned aircraft remain greater than 500 feet apart.
- Hazardous severity refers to outcomes in which
 - the UAS crew is incapacitated;
 - a UAS flies within 500 feet of a manned aircraft; or
 - a UAS causes injury to persons other than the UAS crew.
- Catastrophic severity refers to outcomes in which
 - a UAS collides with a manned aircraft or
 - a UAS causes a fatality or fatal injury to one or more persons other than the UAS crew.

20.2 Likelihood

The FAA defines likelihood as the estimated probability or frequency in quantitative or qualitative terms of a hazard's effect or outcome.

- Frequent - at least once per week.
- Probable - less than once per week and at least once per 3 months.
- Remote - less than once per 3 months and at least once per 3 years.
- Extremely Remote - less than once per 3 years and at least once per 30 years.
- Extremely Improbable - less than once per 30 years.

20.3 Analysis

The Risk Matrix in Figure 20.1 can be utilized to determine whether or not a particular hazard requires mitigation. It also provides insight to the FAA's safety approach.

Observations:

- The FAA labels a UAS-manned aircraft as a catastrophic incident and that it is only tolerable without mitigation if it occurs less frequently than once per 30 years.
- The FAA labels equivalent risk severity for injury a spectator as a UAS flying within 500 ft of a manned aircraft.
- Injuring a member (or three) of the UAS crew is considered a minor severity and any hazard that may cause it to happen more frequently than once per 3 years recommends mitigation.

Chapter 21

Example Flight Request Information

Thank you for reaching out to us to use UAS on our campus. Before we can approve your usage, we must validate that the activity is legal, will be conducted safely and will not interfere with University Business.

Please provide the following information, if applicable, or your contingency plan:

- Remote Pilot Certificate with sUAS rating, or other legal authorization
- Aircraft Registrations
- Certificate of Insurance
- Proposed Flight plan, annotated map preferred
- Safety plans (if appropriate)
 - Emergency Procedures
 - Crew management
 - Crowd control

In general, the proposed operation should not be to fly over campus indiscriminately. The RPIC should select specific flight routes or areas with clear visibility to intruding air traffic and intruding pedestrian traffic and designed such that risks can be effectively managed. Chapter 22 provides a list of common terms of approval that may be utilized in order to approve UAS activity.

Chapter 22

Example Terms of Approval

The Policy does not mandate specific terms for approval for UAS activity. However, there are many situations where special terms of approval should be required. Below includes a handful of common conditions found in Terms of Approvals from a wide range of UAS activity proposed in the past year.

Notification Requirements

- Must notify Designated Local Authority at least 24 hours in advance
- Must coordinate with facility manager
- No prior notification required
- Must notify campus PD at least 72 hours in advance
- Must check in with front office prior to flight
- Must call airport manager at least 45 minutes before flight

Communication Requirements

- Constant communication not required
- A supporting ground crew member must monitor an aviation radio
- RPIC must be reachable via radio during the event

Operational Limitations

- Flight altitude restricted to under 200 ft AGL
- Unmanned Aircraft must remain at least 50 ft away from any non-participants
- Unmanned Aircraft racing path must run parallel to the flight line
- Unmanned Aircraft may not fly over trees or buildings
- Unmanned Aircraft must stay below the tree line
- Unmanned Aircraft may not be flown for more than 7 minutes at a time
- Unmanned Aircraft may not be flown within 150 ft of a residential window

Safety Enhancements

- At least 2 Visual Observers are required
- All participants should wear a high visibility safety vest or conspicuous professional attire.
- Utilize additional ground personnel for crowd control to ensure that non-participants do not enter the flight area.
- A UC staff member must be onsite during all UAS activity.

Currency Requirements

- The RPIC must have logged three launch and landings with a Unmanned Aircraft of the same make/model within the past 90 days.
- The RPIC must have logged six night-time UAS activity within the past 90 days.

- The RPIC must have logged three launch and landings of a similar Risk Score or higher within the past 90 days.

Post Flight Reporting

- RPIC must submit a post-flight report within 2 days of the UAS activity.
- RPIC must submit a set of post-flight reports at the end of every month, no later than 5 business days after the end of the month.
- Course Instructor must submit a proposal of indoor activities and expected usage in lieu of post-flight reporting.

Chapter 23

Example Denial Template

Thank you for utilizing UC Drones to request a UAS flight. UAS flights are reviewed on a case-by-case basis for compliance with federal, state, and local laws as well as impacts on safety and privacy by the UC Center of Excellence on UAS Safety, Campus Risk Management, and University police. Unfortunately, we cannot allow this flight activity for one or more of the following reasons:

LEGAL OR POLICY ISSUES

- The proposed flight operations are prohibited by campus policies
- The proposed pilot does not have the correct Federal Aviation Administration Pilot Certificate
- The proposed pilot does not have the requisite Federal Aviation Administration Airspace Authorization or Airspace Waiver
- The aircraft is not correctly registered as a non-model aircraft with the FAA while being used for non-recreational purposes
- The proposed flight operation would violate FAA regulations without special authorization from the FAA
 - Night operations (14 CFR 107.29)
 - Visual line of sight (14 CFR 107.31)
 - Flight over people (14 CFR 107.39)
 - Other:
- The proposed flight operation would violate FAA regulation. Cite all applicable:
- The proposed flight operation would violate Public Law 112-95, Section 336 – Special Rule for Model Aircraft. Cite all applicable:
- The proposed pilot does not have sufficient aviation liability coverage.
- Other, please describe:

SAFETY ISSUES

- The proponent did not provide evidence of insurance
- The proponent did not provide a sufficient safety case for operating near non-participants
- The proponent did not provide a sufficient safety case for operating near vehicular traffic
- The proposed pilot has not demonstrated sufficient skill for the operation
- The proposed flight altitude is unsuitable for the proposed flight location
- The proposed flight location contains numerous hazards
- Environmental conditions reduce the safety of the operation past acceptable levels
- There are other flights in the area at a similar time
- Other, please describe:

PRIVACY ISSUES

- The flight passes close by sensitive areas without proper precautions
- The operation carelessly collects data from bystanders

- The flight is in an area where people have a reasonable sense of privacy
- There is a history of privacy violations from members involved in the operation
- Other, please describe:

Rejection of a UAS operation is not limited to the list above, but serves to provide common cases for dismissal. Rejection may be a result of extenuating circumstances, compounding risks, or other factors that are not included on this list. This list may be subject to change in the future, due to changes in FAA law, campus policy, or local and state legislation. As such is important to consider these factors when submitting a flight request and attempt to address all non-listed concerns prior to submission.

Chapter 24

Core Competencies

There are four major categories of personnel associated with UAS, each with their own competency and knowledge requirements.

These competencies are the measurable or observable knowledge, skills, abilities and behaviors that are essential for successful performance. This formalization of core competencies establishes the desired minimums for each user group and can be used as a roadmap for readers to assist in identifying their proficiency needs.

24.1 Terms and Definitions

24.1.1 User Groups

- **General User** - a RPIC who operates in exclusively low risk scenarios. A beginner, occasional operator or operates for only specific uses.
- **Power User** - a RPIC who operates regularly in moderate to higher risk scenarios. A operator with significant UAS experience and may be tasked to a wide range of UAS activity.
- **UAS Flight Instructor** - a RPIC who additionally provides occasional or regular flight instruction to others.
- **UAS Flight Reviewer** - a UC staff member responsible for reviewing and approving UAS activity. This may include Designated Local Authorities, the Systemwide Designated UAS Authority or other staff member assigned review authority. In some cases, the responsibilities of a UAS Flight Reviewer may be distributed across subject matter experts.

24.1.2 Domains of Competency

The core competencies have been organized into four domains:

- UAS Regulations
- Campus Procedures
- Risk Management
- UAS Flight Experience

24.1.3 Knowledge Scale

To clarify some of the language related to the aspect of knowing specific subject matter, the following scale is used.

- *Is knowledgeable* - The subject matter is well understood by the user.
- *Is familiar* - The subject matter is familiar to the user to some level of detail.

- *Is aware* - The existence of the subject matter is known to the user and further details can be ascertained as necessary.

24.1.4 Proficiency Ratings

Within each rubric, users can rate their mastery of each identified competency. The rating scale is as follows:

1. No proficiency
2. Limited proficiency
3. Somewhat proficient
4. Fully proficient

24.2 General User

Table 24.1: General User Core Competencies

Rating	Code	Domain	Description
_____	1A1	UAS Regulations	**Is aware** of the applicable federal regulations.
_____	1A2	UAS Regulations	**Is aware** of the registration requirement of an unmanned aircraft.
_____	1A3	UAS Regulations	**Is aware** of State or Local regulations.
_____	1B1	Campus Procedures	**Is aware** of the campus local policy or procedures.
_____	1B2	Campus Procedures	**Is aware** of UAS activity reporting requirements.
_____	1C1	Risk Management	Can identify major risks associated with specific UAS activity
_____	1C2	Risk Management	Can develop a basic mission plan for specific UAS activity
_____	1C3	Risk Management	**Is aware** of common potential safety risks.
_____	1C4	Risk Management	Can implement a field safety plan as applicable.
_____	1D1	Operational Experience	**Is aware** of the operation and use of specific unmanned aircraft.
_____	1D2	Operational Experience	Can implement UAS specific pre-flight inspections.

24.3 Power User

Table 24.2: Power User Core Competencies

Rating	Code	Domain	Description
_____	2A1	UAS Regulations	**Is familiar** with the applicable federal regulations.
_____	2A2	UAS Regulations	**Is familiar** with the registration requirement of an unmanned aircraft.
_____	2A3	UAS Regulations	**Is familiar** of State or Local regulations.
_____	2B1	Campus Procedures	**Is familiar** with the campus local policy or procedures.
_____	2B2	Campus Procedures	**Is familiar** with UAS activity reporting requirements.
_____	2B3	Campus Procedures	Can coordinate and communicate across various campus stakeholders regarding the use of UAS.
_____	2C1	Risk Management	Can identify major risks associated with specific UAS activity

_____	2C2	Risk Management	Can develop an advanced mission plan for specific UAS activity
_____	2C3	Risk Management	**Is familiar** with common potential safety risks.
_____	2C4	Risk Management	Can prepare a field safety plan as applicable.
_____	2C5	Risk Management	Can identify potential risks to privacy, civil rights or liberties
_____	2C6	Risk Management	Can implement a risk management process.
_____	2D1	Operational Experience	**Is familiar** with the operation and use of specific unmanned aircraft.
_____	2D2	Operational Experience	Can implement UAS specific pre-flight inspections.
_____	2D3	Operational Experience	Can develop emergency action plans for off-nominal situations.

24.4 UAS Flight Instructor

Table 24.3: Flight Instructor Core Competencies

Rating	Code	Domain	Description
_____	3A1	UAS Regulations	**Is knowledgeable** with the applicable federal regulations.
_____	3A2	UAS Regulations	**Is knowledgeable** with the registration requirement of an unmanned aircraft.
_____	3A3	UAS Regulations	**Is knowledgeable** of State or Local regulations.
_____	3A4	UAS Regulations	Can articulate UAS regulations effectively
_____	3B1	Campus Procedures	**Is knowledgeable** with the campus local policy or procedures.
_____	3B2	Campus Procedures	**Is knowledgeable** with UAS activity reporting requirements.
_____	3B3	Campus Procedures	Can coordinate and communicate across various campus stakeholders regarding the use of UAS.
_____	3B4	Campus Procedures	Can identify the communication chain of command for UAS activity at a University Location
_____	3C1	Risk Management	Can identify major risks associated with specific UAS activity
_____	3C2	Risk Management	Can develop an advanced mission plan for specific UAS activity
_____	3C3	Risk Management	**Is knowledgeable** with common potential safety risks.
_____	3C4	Risk Management	Can prepare a field safety plan as applicable.
_____	3C5	Risk Management	Can identify potential risks to privacy, civil rights or liberties
_____	3C6	Risk Management	Can implement a risk management process.
_____	3C7	Risk Management	Consistently demonstrates effective risk management for UAS activity
_____	3D1	Operational Experience	**Is knowledgeable** with the operation and use of a range unmanned aircraft.
_____	3D2	Operational Experience	Can implement a range of UAS pre-flight inspections.
_____	3D3	Operational Experience	Can develop emergency action plans for off-nominal situations.
_____	3D4	Operational Experience	Maintains a high level of UAS proficiency.

_____ 3D5 Operational Experience Is effective and convincing in promotion UAS safety.

24.5 UAS Activity Reviewer

Table 24.4: UAS Flight Reviewer Core Competencies

Rating	Code	Domain	Description
_____	4A1	UAS Regulations	**Is knowledgeable** with the applicable federal regulations.
_____	4A2	UAS Regulations	**Is knowledgeable** with the registration requirement of an unmanned aircraft.
_____	4A3	UAS Regulations	**Is knowledgeable** of State or Local regulations.
_____	4A4	UAS Regulations	Can articulate UAS regulations effectively
_____	4B1	Campus Procedures	**Is knowledgeable** with the campus local policy or procedures.
_____	4B2	Campus Procedures	**Is knowledgeable** with UAS activity reporting requirements.
_____	4B3	Campus Procedures	Can coordinate and communicate across various campus stakeholders regarding the use of UAS.
_____	4B4	Campus Procedures	Can identify the communication chain of command for UAS activity at a University Location
_____	4C1	Risk Management	Can identify major risks associated with specific UAS activity
_____	4C2	Risk Management	**Is knowledgeable** with common potential safety risks.
_____	4C3	Risk Management	Can identify potential risks to privacy, civil rights or liberties
_____	4C4	Risk Management	Can implement a risk management process.
_____	4C5	Risk Management	Consistently demonstrates effective risk management for UAS activity
_____	4D1	Operational Experience	**Is familiar** with the general performance of common UAS models.
_____	4D2	Operational Experience	**Is familiar** with the general operation and logistical requirements of UAS activity.

Chapter 25

UAS Policy Full Text

25.1 Policy Statement

The University recognizes that UAS and Small UAS offer great potential as tools for research and other educational functions as well as providing opportunities for recreational use and business pursuits across a diverse array of users and industries. The University also has an obligation to consider public safety, privacy, civil rights, and civil liberties issues related to the use of UAS.

This Policy establishes a Systemwide Designated UAS Authority and a UAS Advisory Board to provide oversight of the use of UAS and to develop and implement policies and guidance for the use of UAS. Executive Officers may assign a Designated Local Authority and authorize the development and implementation of location specific policies and procedures at any University Location within the Executive Officer's jurisdiction. A Designated Local Authority may be authorized to provide oversight at a University Location.

It is the policy of the University that anyone who seeks to operate a University-owned UAS, a UAS for University Business or on a University Location must comply with the following:

- Have approval from the appropriate aviation agency and operate in compliance with all applicable regulations and rulings.
- Receive approval in advance from the Designated Local Authority at a specific University Location or Systemwide Designated UAS Authority.
- Operate in a manner that ensures public safety, right to privacy, civil rights and civil liberties.
- Maintain sufficient liability insurance coverage.

A University location specific policy or procedure may further define an approval process or processes that addresses recurrent, standing, conditional or other forms of approval that constitute written approval. Additional conditions or restrictions may be agreed upon and attached to the approval. A University location specific policy or procedure may additionally further define UAS activity reporting requirements.

Some exceptions from the provisions in this Policy may be made on a case by case basis after review and approval by the UAS Advisory Board, which shall consider and balance relevant factors such as human health and safety, environmental concerns, privacy, the purpose of the proposed UAS activity, and operator experience. The justification for any such exceptions shall be documented in writing by the UAS Advisory Board.

25.2 Compliance/Responsibilities

The goal of this Policy is to ensure that all UAS activities are conducted in a manner that ensures the protection of students, faculty, staff, visitors, the public, property, and the environment and complies with

all applicable laws and regulations. The following individuals have the particular responsibilities for implementing the principles and practices of this Policy.

25.2.1 Executive Officer or their designees are responsible for:

- Communicating the University's commitment to individual's rights safety, privacy, civil rights, and civil liberties.
- Oversight of the interpretation and effective implementation of this Policy at University Locations within their jurisdiction.
- Adopting procedures to ensure implementation of this UAS Policy.
- Authorizing the development and implementation of University location specific policy or procedures, as applicable.
- Assigning a Designated Local Authority as a point of contact who is responsible for developing, implementing, and enforcing University Location-specific requirements, as applicable.

25.2.2 The University of California Office of the President (UCOP) Environment, Health & Safety (EH&S) Executive Director is responsible for:

- Providing Policy interpretation and responding to general inquiries regarding UAS Activities.
- Enforcing the provisions of this Policy.
- Assigning a Systemwide Designated UAS Authority.
- Maintaining records of the results and decisions of the Systemwide Designated UAS Authority.
- Making UAS records publically available as appropriate.
- Appointing members to the UAS Advisory Board.

25.2.3 The Systemwide Designated UAS Authority is responsible for:

- Providing UAS regulatory interpretation and assistance with compliance.
- Ensuring Policy compliance with applicable laws and regulations.
- Providing assistance with requests for UAS activities consistent with applicable laws and regulations and Policy requirements, unless a Designated Local Authority has been selected and delegated this task for specific University Locations.
- Providing support in communication with regulatory authorities, and when appropriate, acting on behalf of University faculty and staff as a point of contact to the applicable aviation authority for UAS registration and flight operations.
- Providing a central repository for all applicable regulations and policies, including international, federal, state and local regulations, and UC location specific policy or procedure and other agency policies, as appropriate.
- Maintaining a record of UAS activity covered under this Policy.
- Implementing effective mechanisms for reporting in order to remain in compliance with applicable laws and policies.
- Providing a forum to communicate and share UAS-related information and best practices.
- Coordinating the development of University UAS policies through task forces/working groups.

25.2.4 The UAS Advisory Board is responsible for:

- Reviewing exceptions from this Policy on a case-by-case basis, subject to the requirements in Section III, above.
- Assisting in the development of systemwide UAS policies.
- Reviewing and commenting on proposed policies and long-term goals.
- Evaluating the effectiveness of systemwide UAS policies and safety metrics.
- Ensuring that systemwide UAS policies remain consistent with applicable privacy best practices.

25.2.5 A Designated Local Authority (if assigned by an Executive Officer or his/her designee) is responsible for:

- Developing location specific policy or procedure that meet or exceed the requirements of this Policy.
- Providing assistance with requests for UAS activity consistent with applicable laws and regulations and University Location-specific policies or procedures.
- Reviewing and approving applications for operation of UAS within the Designated Local Authority's jurisdiction.
- Notifying the applicant if the flight authorization request is approved, denied, or if the flight authorization request will require further information or appropriate aviation agency authorization.
- Maintaining a record of approval requests and decisions, which shall be submitted to the Systemwide Designated UAS Authority upon request.
- Maintaining a record of all UAS flights at University Locations within the Designated Local Authority's jurisdiction, which record shall be submitted to the Systemwide Designated UAS Authority upon request.

25.2.6 Operators of UAS are responsible for:

- Requesting and obtaining all proper approvals prior to operating a UAS at any University Location or for any University Business.
- Following the requirements of this Policy and all applicable laws and regulations.
- Maintaining a safe UAS operating environment.
- Following applicable University UAS privacy best practices.
- Reporting UAS activity to the Designated Local Authority or Systemwide Designated UAS Authority.
- Immediately reporting any accident that results in injury or property damage to the Designated Local Authority or Systemwide Designated UAS Authority.

25.3 Required Procedures

This Policy sets minimum systemwide requirements for operating UAS. The requirements below must be followed at all University Locations. Individual campuses, medical centers, Agriculture and Natural Resources locations, and Lawrence Berkeley National Laboratory, through their respective Designated Local Authorities, may also develop policies and procedures as long as they meet or exceed the requirements of this Policy. The operation of UAS by emergency first responders may be exempt from this Policy based on determination of emergency needs. During such operations, the emergency responders will follow their internal department protocols.

25.3.1 General Procedures

- All persons seeking to operate a University-Owned UAS, a UAS for University Business, or at University Location must first submit a completed UAS Request Form to the Designated Local Authority or Systemwide Designated UAS Authority in advance of any UAS activity.
- The Designated Local Authority or Systemwide Designated UAS Authority will review and process the request and notify the applicant if the request is approved, denied, or will require further information no later than two weeks after submission of an application.
- The request must be reviewed for
 - Compliance with applicable regulations and policies
 - Impacts to public safety
 - Impacts to privacy
 - Impacts to civil rights and civil liberties
 - Compliance with insurance requirements
- Once approved, the operator must follow the requirements of this Policy, any conditions required by the approval, and all applicable laws and regulations.

- A copy of the approval must be in the possession of the operator at all times during the activity and, upon request, must be presented to any University official or representative with jurisdiction over the activity.
- The operator must follow University privacy best practices at all times, including, but not limited to:
- UAS may not be used to monitor or record activities where there is a reasonable expectation of privacy.
- UAS must not be used for unapproved recordings of any campus events or performances, or for any unlawful purpose.
- The operator must provide a post-flight report of UAS activity to the Designated Local Authority or Systemwide Designated UAS Authority as soon as possible.
 - Any accident that results in injury or property damage must be reported immediately.

25.3.2 Registration of UAS

- All UC-owned UAS must be registered in accordance with all applicable laws, regulations, and requirements.
- Registration documents for UC-owned UAS must be submitted to the Designated Local Authority or Systemwide Designated UAS Authority and must reflect the following ownership data:

The Regents of the University of California
(University Location Address)

- Registration documents for all UAS used for University Business must be submitted to the Designated Local Authority or Systemwide Designated UAS Authority.

25.3.3 Liability Insurance

- All UAS activity covered under this Policy must have aviation liability coverage.
- Any 3rd Party or Non-University Business UAS activity must additionally include a written agreement that indemnifies and holds the University harmless from any claims or harm to individuals, damage to University property, and any other claims, liabilities, and potential penalties.
- Recreational users, at the discretion of the Designated Local Authority, may be exempt from the liability insurance requirement if the Designated Local Authority determines that the proposed recreational use poses no risk to the health and safety of persons, property, or the environment and that the cost of liability insurance would pose an undue hardship to the recreational user.

25.3.4 Export Control

- All UAS activity for University Business in foreign nations or by foreign nationals must follow export control regulations and the UC Export Control Policy.
- All UAS activity involving the export of a UAS internationally or use of an export-controlled UAS must be reviewed by the appropriate export control officer.

Chapter 26

UAS Regulations in Detail

26.1 14 CFR 107 - SMALL UNMANNED AIRCRAFT SYSTEMS

The introduction of 14 CFR 107 enabled a wide range of small UAS usage under a set of defined limitations. A Compliance List for 14 CFR 107 is provided below.

26.1.1 Operator Requirements

- A person operating an sUAS must either
 - hold a Remote Pilot Certificate with an sUAS rating
 - or be under the direct supervision of a person who does hold a Remote Pilot Certificate (RPIC).
- A person may not operate an sUAS if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of an sUAS.
- Foreign nationals are allowed to operate under Part 107 if they satisfy the requirements of 14 CFR 375. Typical allowances:
 - Non-commercial operations
 - Recreational activity
 - Specific research activities
 - Foreign nationals from Canada or Mexico (Order 97-7-3, FAA)

26.1.2 Aircraft Requirements

- Unmanned aircraft must weigh less than 55 lbs. (25 kg).
- Unmanned aircraft must be registered with either a ‘N’ number or an ‘FA’ number (Under 14 CFR 47 or 48).
- Unmanned aircraft must be inspected prior to flight by the remote pilot in command.

26.1.3 Airspace Requirements

- Operations in Class G airspace are allowed without Air Traffic Control permission.
- Operations in Class B, C, D and E airspace are allowed with an Airspace Authorization or Airspace Waiver. Operating limitations are specified within a COA (Form 7711) provided by the FAA.

26.1.4 Operating Limitations

- VLOS only.

Note: The unmanned aircraft must always remain within VLOS of the remote pilot in command and the person manipulating the flight controls of the sUAS, even if they are not directly looking at it at every instance.

- At all times the sUAS must remain close enough to the RPIC and the person manipulating the flight controls of the sUAS for those people to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses.

Note: First-Person View cameras do not satisfy VLOS or visual contact regulations, but may be used.

- An sUAS may not operate over any persons not directly participating in the operation, not under a covered structure, and not inside a covered stationary vehicle.

Note: Prior notice and/or consent is not sufficient.

- Daylight-only operations, or civil twilight (30 minutes before official sunrise to 30 minutes after official sunset, local time) with appropriate anti-collision lighting.
- Maximum groundspeed of 100 mph (87 knots).
- Maximum altitude of 400 feet AGL or, if higher than 400 feet AGL, remain within 400 feet of a structure.
- Minimum weather visibility of 3 miles from control station.
- No person may act as a RPIC or Visual Observer for more than one unmanned aircraft operation at one time.
- No operations from a moving aircraft.
- No operations from a moving vehicle unless the operation is over a sparsely populated area.
- No careless or reckless operations.
- No carriage of hazardous materials.
- External load operations are allowed if the object being carried by the unmanned aircraft is securely attached and does not adversely affect the flight characteristics or controllability of the aircraft.
- Transportation of property for compensation or hire allowed provided that-
 - The aircraft, including its attached systems, payload and cargo weigh less than 55 pounds total;
 - The flight is conducted within visual line of sight and not from a moving vehicle or aircraft; and
 - The flight occurs wholly within the bounds of a State and does not involve transport between (1) Hawaii and another place in Hawaii through airspace outside Hawaii; (2) the District of Columbia and another place in the District of Columbia; or (3) a territory or possession of the United States and another place in the same territory or possession.

26.2 Exception for Limited Recreational Operations of Unmanned Aircraft

A person may operate a small UAS without specific certification or operating authority from the FAA if the operation adheres to all of the following limitations:

- The aircraft is flown strictly for recreational purposes.
- The aircraft is operated in accordance with or within the programming of a community-based organization's set of safety guidelines that are developed in coordination with the Federal Aviation Administration.
- The aircraft is flown within the visual line of sight of the person operating the aircraft or a visual observer co-located and in direct communication with the operator.
- The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft.
- In Class B, Class C, or Class D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport, the operator obtains prior authorization from the Administrator or designee before operating and complies with all airspace restrictions and prohibitions.
- In Class G airspace, the aircraft is flown from the surface to not more than 400 feet above ground level and complies with all airspace restrictions and prohibitions.

26.2. EXCEPTION FOR LIMITED RECREATIONAL OPERATIONS OF UNMANNED AIRCRAFT 93

- The operator has passed an aeronautical knowledge and safety test described in subsection (g) and maintains proof of test passage to be made available to the Administrator or law enforcement upon request.
- The aircraft is registered and marked in accordance with chapter 441 of this title and proof of registration is made available to the Administrator or a designee of the Administrator or law enforcement upon request.

26.2.1 Definition of Hobby or Recreational Use

Hobby or recreational use is defined as

- Operated for fun or outside of one's regular occupation
- Operated in furtherance of one's education at an accredited educational institution

Activities that do not qualify for Model Aircraft Regulations

- Commercial activity with compensation
- Commercial activity without compensation
- Activity in furtherance of a business

26.2.2 Use of Unmanned Aircraft Systems at Institutions of Higher Education

For the purposes of the exception for limited recreational operations of unmanned aircraft, a 'recreational purpose' shall include an unmanned aircraft system operated by an institution of higher education for educational or research purposes.

Educational or Research purposes includes

- Instruction of students at the institution;
- Academic or research related uses of unmanned aircraft systems that have been approved by the institution, including Federal Research;
- Activities undertaken by the institution as part of research projects, including research projects sponsored by the Federal Government; and
- Other academic activities approved by the institution

26.2.3 Definition of Community-based organization set of safety guidelines

A Community-Based Organization means a membership-based association entity that

- is described in section 501(c)(3) of the Internal Revenue Code of 1986;
- is exempt from tax under section 501(a) of the Internal Revenue Code of 1986;
- the mission of which is demonstrably the furtherance of model aviation;
- provides a comprehensive set of safety guidelines for all aspects of model aviation addressing the assembly and operation of model aircraft and that emphasize safe aeromodelling operations within the national airspace system and the protection and safety of individuals and property on the ground, and may provide a comprehensive set of safety rules and programming for the operation of unmanned aircraft that have the advanced flight capabilities enabling active, sustained, and controlled navigation of the aircraft beyond visual line of sight of the operator;
- provides programming and support for any local charter organizations, affiliates, or clubs; and
- provides assistance and support in the development and operation of locally designated model aircraft flying sites.

The FAA has interpreted this statement as community-based organizations would include groups such as the Academy of Model Aeronautics and others that meet the statutory definition.

26.3 Representative Safety Code

Reprinted from Academy of Model Aeronautics Safety Code: <https://www.modelaircraft.org/files/105.pdf>

Academy of Model Aeronautics

National Model Aircraft Safety Code

Effective January 1, 2018

A model aircraft is a non-human-carrying device capable of sustained flight within visual line of sight of the pilot or spotter(s). It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and related AMA guidelines, any additional rules specific to the flying site, as well as all applicable laws and regulations. As an AMA member I agree:

- I will not fly a model aircraft in a careless or reckless manner.
- I will not interfere with and will yield the right of way to all human-carrying aircraft using AMA's See and Avoid Guidance and a spotter when appropriate.
- I will not operate any model aircraft while I am under the influence of alcohol or any drug that could adversely affect my ability to safely control the model.
- I will avoid flying directly over unprotected people, moving vehicles, and occupied structures.
- I will fly Free Flight (FF) and Control Line (CL) models in compliance with AMA's safety programming.
- I will maintain visual contact of an RC model aircraft without enhancement other than corrective lenses prescribed to me. When using an advanced flight system, such as an autopilot, or flying First-Person View (FPV), I will comply with AMA's Advanced Flight System programming.
- I will only fly models weighing more than 55 pounds, including fuel, if certified through AMA's Large Model Airplane Program.
- I will only fly a turbine-powered model aircraft in compliance with AMA's Gas Turbine Program.
- I will not fly a powered model outdoors closer than 25 feet to any individual, except for myself or my helper(s) located at the flightline, unless I am taking off and landing, or as otherwise provided in AMA's Competition Regulation.
- I will use an established safety line to separate all model aircraft operations from spectators and bystanders.

Additional information can be found in the Academy of Model Aeronautics Safety Handbook: <http://www.modelaircraft.org/files/100.pdf>

Chapter 27

Additional Resources

27.1 FAA Resources



Figure 27.1: Federal Aviation Administration

FAA Website: <http://www.faa.gov>

Recreational Flyers & Modeler Community-Based Organizations: https://www.faa.gov/uas/recreational_fliers/

Certificated Remote Pilots including Commercial Operators: https://www.faa.gov/uas/commercial_operators/

Educational Users: https://www.faa.gov/uas/educational_users/

Policy Document Library: https://www.faa.gov/uas/resources/policy_library/

27.2 UC Center of Excellence on UAS Safety



Website: <https://www.ucop.edu/safety-and-loss-prevention/environmental/program-resources/unmanned-aircraft-systems-safety.html>

UC Drones Web Application: <http://ehs.ucop.edu/drones>

UC Drones Document Library: <https://ucdrones.github.io/>

27.3 Regulations

United States Code

Public Law

- Public Law 112-95, Title III, Subtitle B- Unmanned Aircraft Systems - Section 331-336: https://www.faa.gov/uas/programs_partnerships/uas_arctic/media/Sec_331_336_UAS.pdf
- Public Law 114-90, Title II, Subtitle B - UAS Safety: https://www.faa.gov/uas/resources/uas_regulations_policy/media/Pages-from-PLAW-114publ190.pdf

Code of Federal Regulations

- 14 CFR 1 - DEFINITIONS, CIVIL AIRCRAFT
- 14 CFR 47 - AIRCRAFT REGISTRATION
- 14 CFR 48 - REGISTRATION AND MARKING REQUIREMENTS FOR SMALL UNMANNED AIRCRAFT
- 14 CFR 91 - GENERAL OPERATING AND FLIGHT RULES
- 14 CFR 101 - MOORED BALLOONS, KITES, AMATEUR ROCKETS, UNMANNED FREE BALLOONS, AND CERTAIN MODEL AIRCRAFT
- 14 CFR 107 - SMALL UNMANNED AIRCRAFT SYSTEMS

Chapter 28

Glossary

Above Ground Level

The term Above Ground Level refers to the height measured with respect to the underlying ground surface.

Academy of Model Aeronautics

The Academy of Model Aeronautics (AMA) is a model aviation association.

Aircraft

An aircraft is defined as a device that is used or intended to be used for flight in the air.

Airspace Authorization

The term Airspace Authorization means a short term or temporary authorization granted by the FAA to a specific organization or person to operate within controlled airspace. An ‘Airspace Authorization’ may be granted with a COA or through (ref:LAANC).

Airspace Waiver

The term Airspace Waiver means a long term authorization granted by the FAA to a specific organization or person to operate within controlled airspace. An ‘Airspace Waiver’ is granted with a COA.

Beyond Visual Line of Sight

The term Beyond Visual Line of Sight means that a person is operating a UAS beyond the definition of Visual Line of Sight.

Currency

The term currency means to demonstrate that one’s skills and flight experience are ‘current’ or up-to-date. Currency may be defined with respect to a category, class or type of aircraft and is defined with respect to a specific time-interval.

Certificate of Waiver or Authorization

The term Certificate of Waiver or Authorization (COA) means an authorization issued by the Air Traffic Organization, a division of the Federal Aviation Administration (FAA), for UAS operations. A COA is filed on FAA Form 7711.

Community-Based Organization

The term Community-Based Organization means a membership-based association entity that (1) is described in Section 501(c)(3) of the IRS Code of 1986; (2) is exempt from tax under section 501(a) of the IRS Code of 1986; (3) the mission of which is demonstrably the furtherance of model aviation; (4) provides a comprehensive set of safety guidelines for all aspects of model aviation addressing the assembly and operation of model aircraft and that emphasize safe aeromodelling operations within the national airspace system and the protection and safety of individuals and property on the ground, and may provide a comprehensive set of safety rules and programming for the operation of unmanned aircraft that have the advanced flight capabilities enabling active, sustained, and controlled navigation of the aircraft beyond visual line of sight of the operator; (5) provides programming and support for any local charter organizations, affiliates, or clubs; and (6) provides assistance and support in the development and operation of locally designated model aircraft flying sites. At this point, the FAA has not released an advisory circular that identifies the criteria and process required for recognition of community-based organizations.

Designated Local Authority

The Designated Local Authority is a single-point of contact or committee appointed by an Executive Officer at an individual University Location to oversee the development, implementation, and enforcement of any University Location-specific UAS related policies and procedures.

Drone

The term drone is a colloquial or common synonymous with Unmanned Aircraft System.

Executive Officer

The Executive Officer means any of the University of California's Chancellors, Medical Center Chief Executive Officers, Director of Lawrence Berkeley National Laboratory, and Vice President for Agriculture and Natural Resources.

Federal Aviation Administration

The Federal Aviation Administration is a division of the United States Department of Transportation that inspects and rates civilian aircraft and pilots, enforces the rules of air safety, and installs and maintains air-navigation and traffic-control facilities.

Lithium Polymer

The term LiPo refers to the regular use Lithium Polymer batteries within UAS. These are now common in most electronics due to their light weight and high energy capacity. However, unlike other batteries, they need special care for charging, discharging and storage.

Location Specific Policy or Procedure

The term location specific policy or procedure means a policy or procedure, or a set of policies or procedures, established at a University Location. The policy or procedure must include a review as described in the UC UAS Policy Guidance Document, but may be flexible to address a diverse set of UAS activity.

National Airspace System

The term National Airspace System (NAS) means the common network of U.S. airspace, including all navigable airspace from the ground up, excluding regions under military jurisdiction. The NAS additionally does not include inside of buildings or enclosed structures.

National Traffic Safety Board

The National Traffic Safety Board is an independent U.S. government investigative agency responsible for civil transportation accident investigation, including aviation and UAS accidents.

Public Aircraft

The term Public Aircraft means an aircraft owned and operated by the government of a State, the District of Columbia, or a territory or possession of the United States or a political subdivision of one of these governments, except when the aircraft is operated for commercial purposes.

Public Agency Operation

The term PAO means an operation conducted by a Public Aircraft that is used for a governmental function as defined by Title 49 USC 40125(a)(2). Specific UAS activity within the UC may be eligible for PAO status. Whether an operation qualifies as a PAO is determined on a flight-by-flight basis.

Remote Pilot Certificate

The term Remote Pilot Certificate means a certificate issued by the FAA that certifies that the owner of the certificate has sufficient aerospace knowledge to operate an Unmanned Aircraft within the National Airspace System. It may also be referred to as a ‘Drone License.’

Remote Pilot in Command

The term RPIC means the person who as the final authority and responsibility for the operation and safety of an UAS operation. This may or may not be the person operating the Unmanned Aircraft. A person may manipulate the controls of a unmanned aircraft under the direct and immediate supervision of an RPIC.

Risk Score

For the purposes of this document, the term Risk Score refers to a customized Risk Score between 1-5 that communicates an approximately level of risk; ranging from minor to severe (potential to cause injury or significant property damage). See Section () for a description of the Risk Score and scoring matrix.

Small Unmanned Aircraft System

The term Small Unmanned Aircraft System means an Unmanned Aircraft weighing less than 55 lbs. and associated elements that are required to operate safely and efficiently in the national airspace system.

Systemwide Designated UAS Authority

The term Systemwide Designated UAS Authority refers to the authority appointed by the University of California Office of the President (UCOP) Environment, Health & Safety (EH&S) Executive Director. The responsibilities of the Systemwide Designated UAS Authority include providing interpretation of UAS regulations, developing UAS policies and procedures, maintaining records of all UAS activity and ensuring regulatory compliance.

Temporary Flight Restriction

UAS Post-Flight Report

The term UAS Post-Flight Report refers to a documented submission of a record of UAS activity. More information on Post-Flight Reports can be found in the UC UAS Policy Guidance Document.

UAS Request Form

The term UAS Request Form or Flight Request refers to a documented request to operate a UAS pursuant to this Policy. The Policy does not mandate a specific form or system as long as the minimum review criteria is met. See UC UAS Policy Guidance Document for further details.

UC Drones

UC Drones is an online application developed by UC Risk and Safety Solutions that enables users to submit UAS requests and document UAS activity. The Systemwide Designated UAS Authority and the Designated Local Authorities may utilize UC Drones to review UAS activity.

UC Agriculture and Natural Resources

The UC Division of Agriculture and Natural Resources (UC ANR) is a division of the University of California system that connects the power of UC research in agriculture, natural resources, nutrition, and youth development with local communities. UC ANR statewide programs includes 4-H, Cooperative Extensions, Master Gardener Program, and includes a system of Research and Extension Centers across California.

UC UAS Policy Guidance Document

The UC UAS Policy Guidance Document is a supplementary guidance document to help with the implementation of the UC's UAS Policy. It contains information regarding how to review UAS activity, safety guidance and other resources. It can be found at http://ucdrones.github.io/Policy_Guidance.

UC Natural Reserve System

The UC Natural Reserve System (UC NRS) is a system of protected ecosystems owned or managed by the University of California that is used for research, education, and public service. The reserves include examples of most of California's major habitat types, from grasslands and deserts to coastal wetlands and conifer forests. With more than 40 sites encompassing some 756,000 acres and growing, the UC NRS is the largest university-administered reserve system in the world.

University Business

The term University Business means the official activities of a University that contribute to any one of the University's major functions of teaching, research, patient care, or public service, or to any other non-recreational University purpose.

University Location

Any property or building that is owned or leased by the University where University business or activities take place.

Unmanned Aircraft

The term Unmanned Aircraft means an aircraft that is operated without the possibility of direct human intervention from within or on the aircraft. This definition includes aircraft of all sizes.

Unmanned Aircraft System

The term Unmanned Aircraft System means an Unmanned Aircraft and associated elements (including communication links and the components that control the unmanned aircraft) that are required for the pilot in command to operate safely and efficiently in the national airspace system. For the purposes of this Policy, this includes unmanned aircraft of all sizes and includes unmanned aircraft operated indoors, in military airspace or in foreign airspace systems.

UAS Activity

The term UAS activity refers to the act of flying for a defined purpose. It may be used to represent a single flight, a set of flights within a single day, a set of flights across multiple days, and may encompass multiple locations.

UAS Advisory Board

The UAS Advisory Board is created by the Policy for the purposes of reviewing and developing future UAS policies.

Visual Line of Sight

The term Visual Line of Sight means that a person is able to 1) know the Unmanned Aircraft's location, 2) determine the Unmanned Aircraft's attitude, altitude and direction of flight, 3) observe the airspace for other air traffic or hazards, and 4) determine that the Unmanned Aircraft does not endanger the life or property of another.

Visual Observer

The term Visual Observer means a person who is designated by the RPIC to assist the RPIC and the person manipulating the flight controls of the UAS to see and avoid other air traffic or objects aloft or on the ground.

3rd Party

For the purposes of this document, a 3rd Party is defined as any person who is conducting University Business but is not affiliated with the UC or any person not conducting University Business.