Unmanned Aircraft Systems in the University of California System

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Topics

Role of the Center on UAS Safety
UASs in the UC System
Authorization Process for UC UASs
UC UAS Management
Upcoming UAS Laws
Student Drone Clubs
Enforcement of UAS Policies
Center of Excellence on Unmanned Aircraft System Safety

Coordinate the development of UC UAS policies through taskforces/working groups

Act as a point of contact for FAA for UAS registration and flight operations (Sec 333 and Public COA)

Ensure compliance with federal/state regulations

Provide assistance in UAS registrations, operations

Develop internal UC policies on certification and flight safety training

Implement effective reporting mechanisms

Act as a central repository for all UAS policies (Federal, State, UC)

Assess and manage risk for UC UAS operations

Enable UAS safety research through effective reporting systems
Guidance

1. Any UAS operated by the UC within the United States National Airspace is subject to FAA rules and regulations.

2. Any UAS operated by a public university must apply to the FAA and receive either a Public Certificate of Authorization (COA) or a Section 333 Exemption.

3. A Public COA allows the UAS to be used only for the limited public purposes or activities specified in the approved COA.

4. A Section 333 Exemption allows certain UASs to be used for commercial purposes as specified in the approved exemption.

5. The UC must obtain authorization for any faculty, staff, or student operating or using a UAS in connection with or as part of his/her UC activities.

6. Any UAS operated by UC faculty, staff, or students in connection with or part of his/her official activities does not qualify as a hobby or recreational use.
Model Aircraft are defined as a subset of Unmanned Aircraft.

Any law that affects the use of Unmanned Aircraft is applicable to Model Aircraft, except as noted in Sec 336 in H.R. 658 – “The FAA Modernization and Reform Act of 2012”
Model Aircraft

Model Aircraft is defined as

1. Capable of sustained flight in the atmosphere;
2. Flown within visual line of sight of the person operating the aircraft; and
3. Flown for hobby or recreational purposes
UC Receives Section 333 Exemption (March 2, 2016)

UC Receives Public Blanket COA (April 5, 2016)

Online Registration (April 7, 2016)

Part 107 Rules (July? 2016)

Small Drone License (Late 2016)

Large SUAS Laws (2020)

UC Merced receives COA (2012)

DJI Starts selling Drones (2008)

Drones are “Next Big Thing” (2012)

Sec 333 Exemptions Introduced (2014)

Public COAs available to Public UAS (2005)

Flying over People Rules (2017?)
UC UAS Authorization Flowchart

**Public Agency Operations (PAO)**
- UC-Owned Aircraft
- Only for public research purposes

**Recreational UAS**
- Privately Owned Aircraft Only
- Not for research or education

**Section 333 Exemption**
- UC-Owned Aircraft
- Only specific UAS models allowed
- Requires Private Pilot’s License
- Can operate as a service (commercial)
- Up to 400 ft

**Stop Not Legal**

**Section 333 Blanket COA**
- Must be 5 NM away from an airport
- 500 ft away from any persons, vehicles or structures
- Authorization granted by UC

**Blanket Public COA**
- Class G Airspace only
- UC Airworthiness Certificate
- Ground School Certificate minimum
- Authorization granted by UC

**Public COA**
- Requires Separate Application (3-5 months)
- One application per purpose, active for 2 years
- No strict limits on operations (ex. Enables above 400 ft, night-flying, within 5 NM of airport, etc)
- Operator must submit reports to FAA

**Section 333 Commercial COA**
- May be within 5 NM from an airport with permission
- May operate in closed-set filming (no distance requirements)
- Requires separate FAA approval (4-6 weeks)

**UC Submits Records to FAA**

**UC grants Authorization**
FAA Sec 333 Approved Aircraft

DJI Phantom 1, DJI Phantom 2, DJI Phantom 2 Vision, DJI Phantom 2 Vision+, DJI Phantom 3, DJI F550 FlameWheel, DJI Inspire 1, DJI Spreading Wing series,

3D Robotics Iris, 3D Robotics Iris+, 3D Robotics X8, 3D Robotics X8+, 3D Robotics Solo, 3D Robotics Aero-M,

PrecisionHawk Hawkeye Mk-III,

Draganflyer X4-ES, Draganflyer X4-P, Draganflyer X6, Draganflyer Guardian,

CyberQuad Maxi and the

Pulse Aerospace VAPOR 55

15/36 aircraft models were rejected by the FAA

Petition to Increase List of Approved Aircraft is in progress
Old Registration Method

Notarized Statement of Small Unmanned Aerial System Ownership

N-Number: ____________

UAS Class:  ☐ Airship,  ☐ Glider,  ☑ Airplane,  ☐ Rotorcraft,  ☐ Hybrid Lift,  ☐ Octocopter

Manufacturer/Builder:  UC Merced  ☐ SkySurfer

Serial Number:  MESA-SS-01  ☐ Max Takeoff Weight:  10  lbs.

Category:  ☐ Land,  ☐ Sea,  ☐ Both

Name of Engine Manufacturer:  Turnigy  ☐ Engine Model Designation:  D3542/6

Engine Serial Numbers:  None

Engine Type:  ☐ Electric,  ☐ 2 Cycle Reciprocating,  ☐ 4 Cycle Reciprocating,  ☐ Turbojet - Fan/Prop/Shaft/Jet

Number of Engines:  1

The Undersigned Certifies (ref. 14 CFR § 47.33 (a) and (b), ownership requirements)

Select and complete one of these statements or compose a statement addressing these issues:

☐ 1) The small unmanned aircraft described above was purchased as a new off-the-shelf item from a retail store, catalog or internet vendor named ______________________ located in (city, state, country) ______________________, on (date) __________. A manufacturer’s bill of sale was not available at the time of purchase, and the (☐ receipt / ☐ invoice / ☐ other evidence) (☐ is enclosed / ☐ not available) to confirm the purchase.

☐ 2) The small unmanned aircraft described above was built from a prefabricated kit. The kit bill of sale from the manufacturer to the undersigned or other evidence to prove the transaction is enclosed.

✓ 3) The small unmanned aircraft described above was built using salvaged, fabricated, miscellaneous, spare or individually purchased parts.
New Online Registration

Welcome to the Small Unmanned Aircraft System (sUAS) Registration Service

This site will allow you to register your small UAS with the FAA and update your registration.

REGISTER
LEARN MORE

Now Valid for UC’s Sec 333 Exemption and Public COAs
Online Registration

Account Type
Select the account type that best fits your UAS usage.

Model Aircraft
I fly my UAS solely for recreation, and not for commercial or other non-hobby purposes.

Non-Model Aircraft
I fly my UAS for commercial, government or other non-hobby purposes.
Online Registration

Currently, we’re letting the individuals complete the registration under the name of “Regents of the University of California”

While it would be more uniform for a centralized approach, it may not be as effective. This will be a discussion topic for the summer Advisory Board.
UAS Registration

Add New UAS

UAS TYPE: Select UAS Type
NICKNAME: Enter a Nickname
MANUFACTURER: Enter a Manufacturer
MODEL: Enter a Model
SERIAL NUMBER: Enter a Serial Number

Cancel
Add

Your cart is empty.

Your cart is empty.

NICKNAME MANUFACTURER MODEL SERIAL NUMBER REGISTRATION ISSUED EXPIRES
Phantom 2 Vi... DJI Phantom 2 V... PH645454772 FA3XKW7ELR 04/01/2016 04/01/2019
The FAA has not developed a registry for the new online registrations, but is expected mid-2016.
Sec 333 Obligations

All Sec 333 Flight Operations must submit a Project Packet to the UC

- Date and times of the flights;
- Purpose of the flight;
- Name and certificate number of the PIC;
- Geographic location of the flights and, if applicable, a map of the area with sufficient detail to assess possible obstacles or hazards for the flight;
- A listing of any airports or heliports within 5 NM of the proposed flight area as well as the location of any structures or hazards to the flight;
- Name and contact information for the University UAS Operations Manager;
- Maximum operating altitude;
- What sensor or payload is necessary to successfully complete the mission and whether the sensor selected requires a separate Sensor Operator to ensure the safe completion of the flight;
- Locations for the PIC, Observers, and Sensor Operator (if any);
- Contact information for local first responders such as fire and rescue or police;
- Contact information for local ATC controlling facility (if applicable);
- Copy of the COA governing the flight;
- Copy of the NOTAM for the flight operations;
- Sectional chart overlay, if available, of the operation area with special focus on possible air traffic deconfliction areas.
Sec 333: The Fine Print

The UAS may not be operated over congested or densely populated areas.

The University shall report any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by an applicable COA will be reported to the FAA’s UAS Integration Office (AFS-80) within 24 hours.

The University shall comply with the periodic reporting requirements contained in the applicable COA.
Sec 333: Documentation Requirements

- **Post Flight Summaries**
  - The University will maintain Post Flight Summaries using manufacturer provided checklists or, if unavailable, using a Post Flight Summary form. The Post Flight Summary form may be used to establish the operational history of the UAS, as necessary.

- **Incident Reports**
  - The University will maintain a record of any accidents, incidents or deviations encountered using an Incident Report form.

- **Lost-Link Report**
  - The University will maintain records of any lost-link encountered using a Lost-Link form.

- **Maintenance Records**
  - The University will maintain records of all required UAS maintenance, preventative maintenance, inspections, repairs, modifications, alterations and overhauls using the Maintenance Log.

- **Flight Logs**
  - The University shall maintain a record of all flights using the Flight Log.

- **FAA Reporting Requirement**
  - The University shall document all operations associated with UAS activities as required by the applicable COA.
  - To ensure compliance with FAA reporting requirements under a University’s COA, the following information must be maintained for each UAS flight:
    - Operator name, and exemption/aircraft registration no.’s;
    - UAS types and models;
    - All operating locations, to include location city/name and latitude longitude;
    - Number of flights (per location, per aircraft);
    - Total aircraft operational hours;
    - Takeoff and Landing damages;
    - Equipment malfunctions.
Blanket COA

Requires a pilot with one of the following certificates:
- Airline transport
- Commercial
- Private
- Recreational
- Sport

Must operate at least 500 ft from all nonparticipating persons, vessels, vehicles and structures:
- The only people declared as not nonparticipating is the pilot, visual observer, any trainees or flight essential personnel.

Must be operated over private or controlled-access property with permission from the property owner/controller or authorized representative.

Specific Aircraft Only
- Flights at or below 400 ft
- Aircraft under 55 lbs
- Operate during VFR conditions during daylight only
- Operate within VLOS
- 5 NM away from an airport tower
- 3 NM away from an untowered airport with instrument flight procedures
- 2NM away from an untowered airport without instrument flight procedures
- 2NM away from a helipad
Section 333 Exemption Flow – Under 400 ft

Private Pilot’s License

Purchase Approved Aircraft

Register Aircraft

Request Approval from UC CoE on UAS Safety

Blanket COA Flights
  • Under 200 ft
  • Away 5 nm from airports
  • Away 500 ft from people, persons, structures or vehicles

Reports to CoE

4/12/2016
Sec 333 COA

Requires a pilot with one of the following certificates
  ◦ Airline transport
  ◦ Commercial
  ◦ Private
  ◦ Recreational
  ◦ Sport

Must operate at least 500 ft from all nonparticipating persons, vessels, vehicles and structures
  ◦ The only people declared as not nonparticipating is the pilot, visual observer, any trainees or flight essential personnel.

Must be operated over private or controlled-access property with permission from the property owner/controller or authorized representative

Flights at or below 400 ft
  Must apply from FAA
  Aircraft under 55 lbs
  Operate during VFR conditions during daylight only
  Operate within VLOS
  Requires a letter of agreement from an airport to operate within 5 NM
  Must file a NOTAM
Section 333 Exemption Flow – Near airports

1. Private Pilot’s License
2. Purchase Approved Aircraft
3. Register Aircraft
4. Request Approval from UC CoE on UAS Safety

- File Sec 333 Exemption COA to FAA ~ 60 days
  - Sec 333 COA Flights
    - Near an Airport
    - Away 500 ft from people, persons, structures or vehicles

Reports to CoE
Closed Set Blanket COA

Requires a pilot with one of the following certificates
- Airline transport
- Commercial
- Private
- Recreational
- Sport

Requires a veteran pilot with at least 25 hours of logged flight time

May operate within 500 ft of authorized persons

Must be operated over private or controlled-access property with permission from the property owner/controller or authorized representative

Flights at or below 400 ft

Aircraft under 55 lbs

Operate during VFR conditions during daylight only

Operate within VLOS

Requires a letter of agreement from an airport to operate within 5 NM

Must file Project Packet with local FSDO
Section 333 Exemption Flow - Closed Set – Under 200 ft

- Purchase Approved Aircraft
- Register Aircraft
- Request Approval from UC CoE on UAS Safety
- Notify FAA 3 days in advance
- Blanket COA Flights
  - Under 200 ft
  - Away 5 nm from airports
  - Veteran Pilot
- Reports to CoE

Private Pilot’s License
Public Blanket COA

Requires a pilot with one of the following certificates
- Airline transport
- Commercial
- Private
- Recreational
- Sport

Must operate at least 500 ft from all nonparticipating persons, vessels, vehicles and structures
- The only people declared as not nonparticipating is the pilot, visual observer, any trainees or flight essential personnel.

Must be operated over private or controlled-access property with permission from the property owner/controller or authorized representative

Any registered vehicle

Class G Airspace only

Flights at or below 400 ft

Aircraft under 55 lbs

Operate during VFR conditions during daylight only

Operate within VLOS

5 NM away from an airport tower

3 NM away from an untowered airport with instrument flight procedures

2NM away from an untowered airport without instrument flight procedures

2NM away from a helipad
Public Blanket COA (new)

- Private Pilot’s License
- Purchase Aircraft
- Build Aircraft
- Register Aircraft
- Obtain UC Airworthiness Certificate

Request Approval from UC CoE on UAS Safety

Blanket COA Flights
- Under 400 ft
- Class G Airspace only
- Away 500 ft from people, persons, structures or vehicles

Reports to CoE
Public COA

- Request access to FAA COA System
- Private Pilot’s License
- Purchase Aircraft
- Build Aircraft
- Register Aircraft
- File COA to FAA ~ 90-150 days
- Inform UC CoE on UAS Safety
- Public COA Flights
  - Operations defined by COA
  - No strict limitations

Reports to CoE
Center on UAS Safety

Develop an educational seminar to inform staff of UAS regulations and UC policies regarding UASs
  ◦ Center will propose site visits and interactions

Develop talking points for UAS-related incidents

Develop a biannual newsletter with regulatory updates

Develop a UC System UAS Policy Manual
Center on UAS Safety

Assistance on UAS Registration
  ◦ Form fillable forms and automatic registration

Sec 333 Forms and Logging Systems

Guidance on Public COA applications

Lists of approved pilots and vehicles

Lists of vetted Sec 333 contractors
Part 107 – Proposed Drone Laws

Similar to Blanket COA

Up to 500 ft, within VLOS, Daylight only, no flying over people

Requires records to be available to the FAA on request

Must have “Drone License”
  ◦ Involves taking an FAA-approved knowledge test at a FAA Testing Facility
  ◦ Renewable every 2 years

Flight records must be made available to FAA on request
  ◦ No specifications on what constitutes as flight records

Aircraft not required to receive an Airworthiness Certificate
  ◦ This provision is one of the exemptions provided by a Sec 333
Part 107 – Proposed Drone Laws – What it doesn’t Allow

No flights above 500 ft
No flights at night
No Beyond Line of Sight
No Flying over people
UC System with Part 107

ADVANTAGES

Need for Sec 333 exemptions and public COAs significantly reduced

Very suitable for most research and commercial needs

Drone License ~ $200-400 – Suitable for a dedicated researcher or staff member

DISADVANTAGES

Vague recording requirements
  ◦ UC System is the registered owner of the vehicle, hence the system is still liable for making records available

Drone License ~ $200-400, still not suitable for an academic class

Altitude limit necessitates continued support for Public COAs or Section 333

Restriction on flying over people in place until next round of Proposed Laws (announced on 4/6/2016)
UC UAS Authorization
Flowchart (Proposed Laws)

Recreational UAS
- Privately Owned Aircraft Only
- Not for research or education

Public Agency Operations (PAO)
- UC-Owned Aircraft
- Only for public research purposes

Section 333 Exemption
- UC-Owned Aircraft
- Only specific UAS models allowed
- Requires Drone License
- Up to 400 ft
- May be within 5 NM from an airport with permission
- May operate in closed-set filming (no distance requirements)
- Requires separate FAA approval (4-6 weeks)

Blanket Public COA
- Class G Airspace only
- UC Airworthiness Certificate
- Authorization granted by UC
- May not require Drone License

Public COA
- Requires Separate Application (3 months)
- One application per purpose, active for 2 years
- No strict limits on operations (ex. Enables above 400 ft, night-flying, within 5 NM of airport, etc)
- Operator must submit reports to FAA

Part 107
- Up to 500 ft
- Any aircraft
- Requires Drone License
- May be within 5 NM from an airport with permission

Stop Not Legal
Example Scenarios

Researcher doing field work off-campus
  ◦ Part 107 Rules

Researcher flying above 500 ft
  ◦ Public COA – Needs to apply to the FAA

School Publicity Filming of Event or Campus
  ◦ Sec 333 motion picture rules

Researcher flying within an urban environment
  ◦ Sec 333 motion pictures or blanket COA, depending on environment
  ◦ May fall under proposed MicroUAS Laws (2017)
Proposed UC Policy under Part 107 Rules

(In addition to compliance with Part 107)

UC-owned vehicles must be registered to the Regents of the University of California

All UC UAS pilots must undergo an online safety training, similar to the lab safety training offered by EH&S

All UC UAS operations must be submitted to the portal prior to operations

All UC UAS operations must be recorded on the portal

While the pre-authorization is not federally mandated, it would serve as an efficient method to double check that Part 107 laws are being followed
Airports Near UC Campuses

**UC Merced**
- Mercy Medical Center - 2.72 m - helipad

**UC Davis**
- *University Airport* - 1 m - GA, university owned

**UC Berkeley**
- Children's Hospital - 2.47 m - helipad
- Sandhill - 4.86 m - helipad

**UC Santa Cruz**
- Dominican Santa Cruz Hospital - 4.25 m - helipad

**UCLA**
- Too many to list (11 Helipads)
  - *Santa Monica Airport* – 3.13 m – *Class D airspace*

**UC Santa Barbara**
- *Santa Barbara Airport* - 1 m - *Class C airspace*
  - Platform Holly - 3.68 m - helipad
  - Elwood Onshore Facility 3.83 m - helipad

**UC Irvine**
- The Atrium - 2.11m
- Newport Beach Police - 2.3 m - helipad
- Jamboree Center Helistop - 2.44m - helipad
  - *John Wayne* - *2.71 m* - *Class C airspace*
- Centerport - 2.73m - helipad
- Opus Center Irvine - 2.89m - helipad
- KCIN Emergency - 3 m - helipad
- South Coast Metro Center - 3.73m - helipad
- Costa Mesa Police Dept - 3.82m - helipad

**UC San Diego**
- Scripps Memorial Hospital - 0.6m - helipad
- UCSD Health System East Campus - 0.71m - helipad
- Torrey Pines - 1.07m - Gliderport
- Qualcomm Building N - 2.38m – Helipad
  - *MCAS* – 4.93 M – *Airport*

**UC Riverside**
- Johnson - 2.49m - helipad
- City Hall - 2.76m - helipad
- Riverside Metro Center - 2.86m - helipad
- Riverside Community Hospital - 3.13m - helipad
  - *FLABOB* - 4.85m - *Airport*
UASs in the Classroom

Neither Section 333 or Part 107 Laws enable flying UASs as a part of a class

- Part 107 introduces a new license, but still pricey for students

Currently a flying cage is one of the better solutions

- $4000-10,000
- Within the cage, FAA has no jurisdiction (ie, no license required).
- UC can develop policies to ensure safe flying
UAS Student Clubs

Student clubs may fall under “Recreational or Hobby” use
- Depends on the nature of the affiliation with the university

Students should be strongly encouraged to join a National Model Aeronautics group (such as the AMA)
- Safety Code
- Minimal Insurance (Secondary)

Recommend the students have a National Model Aeronautic Club charter to establish a clear paper trail of their Hobby/recreational status

The UC still has the authority to set the conditions for access to university property
- Including requiring the documentation of recreational flights

No National Aeronautic Group allows for flying over people in an unsafe manner
Enforcement of UAS Policies

Universities may not regulate FAA airspace, but they may put in place policies regarding student use of UAS on their campuses.

Laws and Policies traditionally related to state/local police power – including land use, zoning, privacy, trespass can be implemented.

14 CFR 91.13 – Careless or Reckless Operation

- *(a)* Aircraft operations for the purpose of air navigation. No person may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.
Contact Information

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Telephone by appointment