UC CENTER OF EXCELLENCE ON UAS SAFETY

Newsletter – August 23, 2016

**UAS SAFETY & RISK MANAGEMENT**

As campuses face increasingly more UAS activity with the new drone laws enacted next Monday, safety and risk management will play a large role. Please don't hesitate to reach out to the Center of Excellence on UAS Safety at UASSafety@ucmerced.edu or (209) 201-2051 if you have any questions or need guidance.

**UAS SAFETY MANAGEMENT SYSTEM**

In the UC System, we employ a holistic UAS Safety Management System that is comprised of three components: Safety Policy, Safety Risk Management and Safety Assurance.  For a full overview of the UC's Safety Management System, you may look through the slides provided here: ([http://ucop.edu/enterprise-risk-management/\_files/uas/UAS%20Safety%20and%20Risk%20Management.pptx](http://ucop.edu/enterprise-risk-management/_files/uas/UAS%20Safety%20and%20Risk%20Management.pptx%22%20%5Ct%20%22_blank))

This email will focus on Safety Risk Management, but further information on UAS Policies and Safety Assurance will be coming out soon.

**WHAT MAKES A SAFE UAS FLIGHT?**

A safe UAS flight is one that poses no danger to the participants, non-participants, or property.  Rather than focus solely on preventing an aircraft from crashing, safety risk management includes identifying and assessing risk across several different aspects. Since just enumerating all potential hazards can be a challenge, especially for those who are new to the UAS field, we have a handful of tools available to use.

**HAZARD IDENTIFICATION**

While some hazards are easy to spot (flying too close to people), others may be harder to identify.  The SHELL model is a systematic approach to looking for potential hazards.  Instead of looking at just the aircraft, the model recognizes that the connections between the components of the system are sources of potential hazards as well.  More detailed information about the SHELL model can be found in the presentation.  The Hazard Identification Questionnaire ([http://ucop.edu/enterprise-risk-management/\_files/uas/Hazard%20Identification%20Questionnaire.pdf](http://ucop.edu/enterprise-risk-management/_files/uas/Hazard%20Identification%20Questionnaire.pdf%22%20%5Ct%20%22_blank)) can help identify hazards. While it is not an exhaustive list of hazards, it can help gather information about the system to make appropriate assessments.

**COMMON HIDDEN HAZARDS**

· Be on the lookout for at-risk UAS behavior.  As with driving, complacency to risk is a serious concern.  Anyone who is not actively planning for safety is cause for concern.

· Flights near buildings or between buildings have numerous hidden risks.  Tall buildings interfere with GPS signals and buildings with high levels of metal will lead to unreliable compass readings.  As many commercial systems rely on accurate GPS and compasses for guidance, the drones may behave erratically.  In addition, the air flowing around buildings are often non-intuitive and can create additional causes for concern. Thermals (columns of rising air) are also often generated on hot asphalt and can lead to inconsistent flight performance.

· Be on the lookout for potential sources of radio interference.  Power lines, large broadcast antennas, hand-held radios, and even large crowds of people with cellphones have been known to create UAS communication issues. Make sure any proposed flight plan has plans to ensure clear radio communication with the aircraft at all times.

· Drones don't fall straight down. Instead, they fall in the direction of their momentum.  When evaluating the flight paths of drone flights (especially near people), examine where the aircrafts momentum may lead it in the event of an in-flight failure.  Operators should be encouraged to fly paths away from crowds rather than to them.

· Flights in fields that are gated off are excellent locations for drone flights on campuses.  The same is not true for flights in fields surrounded by high trees or buildings.  Visual obstructions such as trees prevent operators from monitoring for intruding air traffic.  UAS flights are often allowed up to 400 ft, far above the tree line or building heights (commonly no higher than 30-40 ft) and with all UC campuses located near medical helipads, there is cause to be extra cautious.  Keep all UAS flights within the range of visibility of both the aircraft and any potential intruding air traffic.

**CONTROLLING RISK**

Eliminating the hazards is always the most effective means to ensure safety, but certainly not all of the risks can be eliminated.  It is best to be scale appropriate, but in this new field, effective control strategies can be hard to nail down.  Best practices start with situational awareness and training.  Currently, the no automated safety systems or built-in safety features is considered reliable enough by the FAA for risk mitigation.  The onus of safety is dependent on the operator to both plan for safety and be prepared for emergency situations. As a risk manager, it means we must ensure that all UC UAS operators are prepared.  Make sure that the operators are aware of risks and have plans for what to do if something goes wrong.  Require operators to brief all crew members on the plan of action and plans for emergency scenarios.

**MOVING FORWARD**

Currently the biggest challenge we face is the lack of information on UAS activity at all the UC campuses.  I have a flight request form and a flight reporting form available at [http://www.uassafety.ucmerced.edu](http://www.uassafety.ucmerced.edu/%22%20%5Ct%20%22_blank).  You are free to direct UAS users at your campuses to use these forms as a temporary measure until we migrate to the larger system hopefully before the Fall Quarter begins at many of the campuses. Any requests or reports I receive will be forwarded to the campuses for their records. I'll also transition all of these records into the new system when it comes online.

**Flight Request**: [http://uassafety.ucmerced.edu/form/temporary-uas-flight-request](http://uassafety.ucmerced.edu/form/temporary-uas-flight-request%22%20%5Ct%20%22_blank)

**Flight Reporting:** [http://uassafety.ucmerced.edu/form/temporary-uas-flight-reporting-system](http://uassafety.ucmerced.edu/form/temporary-uas-flight-reporting-system%22%20%5Ct%20%22_blank)

**FURTHER READING**

• UC Center of Excellence on UAS Safety ([http://ucop.edu/enterprise-risk-management/resources/centers-of-excellence/unmanned-aircraft-systems-safety.html](http://ucop.edu/enterprise-risk-management/resources/centers-of-excellence/unmanned-aircraft-systems-safety.html%22%20%5Ct%20%22_blank))

• Register your UAS ([https://registermyuas.faa.gov/](https://registermyuas.faa.gov/%22%20%5Ct%20%22_blank))

• Fly for Fun ([https://www.faa.gov/uas/getting\_started/fly\_for\_fun/](https://www.faa.gov/uas/getting_started/fly_for_fun/%22%20%5Ct%20%22_blank))

• Fly for Work/Business ([https://www.faa.gov/uas/getting\_started/fly\_for\_work\_business/](https://www.faa.gov/uas/getting_started/fly_for_work_business/%22%20%5Ct%20%22_blank))

• Becoming a Pilot ([https://www.faa.gov/uas/getting\_started/fly\_for\_work\_business/becoming\_a\_pilot/](https://www.faa.gov/uas/getting_started/fly_for_work_business/becoming_a_pilot/%22%20%5Ct%20%22_blank))

• FAA Frequently Asked Questions ([https://www.faa.gov/uas/faqs/](https://www.faa.gov/uas/faqs/%22%20%5Ct%20%22_blank))

• Summary of Part 107 ([https://www.faa.gov/uas/media/Part\_107\_Summary.pdf](https://www.faa.gov/uas/media/Part_107_Summary.pdf%22%20%5Ct%20%22_blank))

• How to use the new Rule ([https://www.faa.gov/uas/media/AC\_107-2\_AFS-1\_Signed.pdf](https://www.faa.gov/uas/media/AC_107-2_AFS-1_Signed.pdf%22%20%5Ct%20%22_blank))

Brandon Stark, *Director*

UC Center of Excellence on Unmanned Aircraft System Safety

[http://tinyurl.com/UC-UAS-COE](http://tinyurl.com/UC-UAS-COE%22%20%5Ct%20%22_blank)

University of California

bstark2@ucmerced.edu

[https://www.facebook.com/UC.UAS.Safety/](https://www.facebook.com/UC.UAS.Safety/%22%20%5Ct%20%22_blank)

Contact erm@ucop.edu to be added to the UC-UAS-RESEARCH-L listserv