UNMANNED AIRCRAFT SYSTEM SAFETY

Center of Excellence on Unmanned Aircraft System Safety

Guidelines for Operating in High Air Traffic Zones

For our UAS operators who operate in rural areas or in proximity to military bases, we know that the threat of low-flying crop-dusters, military helicopters or student pilots can significantly impact your operations. Here are some guidelines to help keep you safe when operating in these high-risk zones.

SEE AND AVOID

When your piloting an sUAS, you must yield the right of way to all aircraft, airborne vehicles and launch and recovery vehicles (107.37). This is more commonly described as 'Seeing and Avoiding.' While it seems a simple concept, this is made more difficult when you are not inside the aircraft. We can break down 'Seeing and Avoiding' into four discrete steps:

- Detect – Detecting a potential hazard
- Identify - Identifying the altitude and path of the threat
- Assess – Determining whether a collision is imminent or possible
- React – Taking evasive actions such as descending

All four stages take time – however you may only have seconds to react. Take precautions and steps to minimize the time it takes to complete each of the four stages.

GUIDELINES

- Always bring a visual observer (minimize the time to detect)
- When scanning for air traffic, focus on the horizon first – where the most pressing threats are likely to be. (minimize the time to detect)
- Choose operating locations with a clear view all around. If there are trees, buildings or obstructions blocking the horizon, set up a visual observer to monitor with a clear view. (minimize the time to detect and identify)
- Visual Observers should be instructed and trained to communicate verbally the following conditions
    - Possible aircraft heard
    - Visual contact with aircraft
    - Threat inbound from *direction*
    - Confirmed non-threat
- Maintain a 'sterile cockpit' – No extraneous conversation during operations, maintain boundaries to keep spectators from asking questions, focus only on the task of flying and take active steps to avoid distractions.
- In areas around towers, bring an aviation radio and listen to CTAF (minimize the time to detect or identify)
- Keep your aircraft altitude as low as possible (minimize the time to assess)
- Keep your aircraft horizontal distance as short as possible (minimize the time to assess)
- Pre-identify escape routes or actions to take (minimize the time it takes to react)
- Be prepared to initiate a pre-planned mitigation strategy at once (minimize the time to react)

Notes

- You are likely to hear an aircraft long before you see it. Listen carefully and scan the horizon.
- Take care to not confuse the sounds of a truck with the sounds of a distant aircraft.
- You are more likely to be hit by an aircraft than to hit an aircraft – your operation of a drone is similar to a kid playing in a busy street – treat it as such – only stay in the air as long as it takes to complete your mission.
- Manned aviation is unlikely to see or notice your UAS until it is too late.
- If manned aircraft does notice your UAS, keep in mind that they do not know your intentions and have no means to communicate with you. They will react defensively to protect the lives onboard – which may result in civil penalties if you disrupt emergency operations.

For more information about the Center of Excellence on Unmanned Aircraft System Safety, visit the webpage at http://ucop.edu/enterprise-risk-management/resources/centers-of-excellence/unmanned-aircraft-systems-safety.html or contact the Center at UASSafety@ucmerced.edu or (209) 201-2051.