Safe landing Areas

Prior to take-off the Pilot in Command (PIC) and observer will review the immediate area and use all information available to determine designated "safe zones" for an emergency landing if needed. These areas are agreed upon, and any other ground crew members involved with the mission will be briefed on the location and circumstances for which they will be used.

Poor Data-link Signal Strength

A 2.4 GHz data-link for a ground control station is provided with the swinglet CAM and has a range of 1 Miles as well as a remote control for manual flight with a range of 0.5 miles. The operations will be limited to 0.5 Miles (as well as limiting the distance depending on visual contact limitations) to insure connectivity. In the event of weak signal strength the operator will re-task, or manually control the sUAS to fly in the direction of the operator to regain signal strength. In "return to rally" the aircraft will return to the pre-designated rally point if proper signal strength cannot be maintained. If the issue is persistent enough to affect the "return to rally" operation the PIC will manually land the sUAS at one of the pre-designated safe landing area.

Low battery Indication

As part of the preflight sequence the battery level is checked to insure a full charge. The sUAS will not be allowed to fly a mission without a full charge at takeoff. In the event of a low battery charge the swinglet CAM will send an alert to the controller software. The PIC will issue an order to have the swinglet CAM return to the take-off location and land before the battery is depleted. In the event of a depleted battery during flight the operator will re-task, or manually control of the sUAS to fly in the direction of the operator to "return to rally" or return to a safe landing area.

Aircraft lost data link procedures

Routinely, the operator should be able to avoid a lost-link situation, either with communication from GPS satellites or communication to the base station, by monitoring signal strength and taking corrective action prior to a loss of link. However, should lost link occur, one of three actions can be taken to avoid any adverse incident:

1. If the aircraft continues to have GPS link but loses data communication with either or both the ground station and the remote control, the swinglet will return to the rally point (or other pre-designation landing area) and initiate an "auto-landing" after completing its pre-programmed mission.
2. If the aircraft loses communication to the GPS satellites, the PIC will manually pilot the sUAS either to its landing point or to a pre-designated safe landing area. A landing order can be given at any time it reaches a designated landing area where the swinglet will perform an auto land sequence.
3. If the aircraft loses all communication from the GPS satellites, ground station and remote control it will perform an auto land sequence at its current location.

As an added measure of security, a security zone is defined at 0.8 miles from the base station for a maximum allowable distance the sUAS can travel before automatically returning to the takeoff or rally

point. If this zone is violated the swinglet will trigger an alarm through the software to notify the PIC. This security zone limits the operations using the on-board computer and GPS.

In the event of an emergency landing in a safe zone, the PIC or Observer will communicate the situation to the ground crew and point out any hazards to personnel. The Observer will either collocate within speaking distance of the PIC, or if this is not practical, utilize 2 way radio communications with the PIC thereby facilitating clear and immediate communications between PIC and Observer.

If visual contact is lost with the lost-link aircraft, the PIC and/or Observer will note the approximate altitude and direction of travel of the aircraft. This information will be communicated as soon as possible to any air traffic control facility that may be controlling aircraft that may be affected by the lost-link aircraft.