



EMERGENCY LANDING LESSON PLAN

There are any number of reasons that a pilot may have to execute an emergency landing procedure. The battery on board the aircraft may have bad cells causing a loss of propulsion, the motors or ESC's could fail mid-flight, manned aircraft may enter your operations area, etc. Typically, an emergency landing will be executed if any major component fails, or if it is in the best interest of safety. It is critical that students understand how to conduct an emergency landing under varying circumstances. Simulating a major component failure or a loss of propulsion during a flight is a great way to develop these necessary skills.

During an emergency landing, pilots will quickly need to determine an alternate landing area and begin a rapid, controlled decent to the new landing location. Students should be able to recognize situations that could warrant an emergency landing and demonstrate an understanding of how to safely and quickly land their aircraft in an emergency situation. Students should understand the importance of quick decision making and how to determine a safe alternate landing location.

Maneuver Setup

- Define an operations area for the aircraft to preform maneuvers
- Ensure the student understands how to perform an emergency landing with the platform they are operating.
- Discuss how to quickly determine alternate landing areas using available resources.
- Discuss how the student should respond to a situation that would require an emergency landing.
- The instructor will demonstrate an emergency landing to ensure student understanding.

Maneuver Execution

- Complete all relevant pre-flight requirements (checklists, briefings, etc.).
- Announce takeoff and establish a hover at a maneuvering altitude (+/- 5ft).
- Preform aircraft control check (+ pattern).
- Instruct student to fly maneuvers/ patterns as they would for a normal operation or training lesson.
 - Ensure student is relatively close to the operations area during this phase.
 - Student should be at an altitude of 200 – 300 feet for their first emergency landing lesson.
- Instructor will tell the student that they have “just experienced a major component failure”.
 - Instructor can use a variety of scenarios to simulate the component failure, typically a battery failure or loss of propulsion situation is used.
- Student should announce the failure to alert other crew members (if applicable).
- Student will need to determine an alternate landing area using all of their available resources.
 - Have student navigate to an alternate landing area inside your defined practice area for the first simulation to ensure proper techniques are being used.
 - Student should execute a rapid, controlled decent to the alternate landing location.
 - As the student becomes more proficient, have them execute the emergency landing from a lower altitude (less time to respond to the emergency) and have them select alternate landing locations just outside of your defined operations area.
 - During simulated emergency landings, it is okay to simulate landing at the alternate landing location without actually touching down (to ensure aircraft safety).
 - In most cases, a map of the geographic operating area should be visible on the ground station allowing the student to locate a safe, unpopulated area to simulate the alternate landing.
- Decisions are timely and of sound aeronautical decision making and judgment.

EMERGENCY LANDING LESSON PLAN CONT.

Maneuver Execution (continued)

- Aviate, navigate, communicate.
- Student safely navigates aircraft to the alternate landing location.
- Student promptly disarms the aircraft.
- Retrieve aircraft from new landing location.

Common Errors

- Student does not anticipate an emergency.
 - Students needs to be able to anticipate a critical component failure that could lead to an emergency landing situation.
- Pilot does not react.
 - Fails to recognize the emergency situation promptly.
 - Fails to alert crew members of the failure (if applicable).
- Student fails to locate a proper alternate landing location.
 - Puts people or property on the ground in jeopardy.

Grading Criteria

Standards (Level 1)

Student unable to accomplish task without significant Instructor intervention

Student induces unacceptable inputs or commands to the UAS

Student is reckless

Student continuously falls "behind the aircraft"

Student becomes disoriented and confused by the GCS display

Student not compliant with regulations or guidance

Safety of flight violation

Standards (Level 2)

Instructor occasionally intervenes

When a wrong input is made, the student recognizes the problem but does not react quickly

Student occasionally makes mistakes

Student gets "behind the aircraft" during high workload situations but fights to catch up

Student has a good understanding of the GCS but takes some time to find the correct button or setting

Standards (Level 3)

Instructor rarely provides guidance or intervenes for non-critical events

Student rarely provides erroneous input but quickly corrects them

Student rarely makes a mistake

Student generally stays ahead of the UA

Student has a strong understanding of the GCS and corresponding button locations

Standards (Level 4)

Instructor assistance not required

Student inputs are flawless

Student makes minor mistakes, self-corrects without negative impact

Student is proficient with the system and stays ahead of UA

Student demonstrates mastery of the GCS layout and functions with effective scan of pertinent systems