EMERGENCY PROCEDURES & MISHAP RESPONSE

TOOLBOX TALK: Emergency Procedures & Mishap Response

RATTLIR Safety Series – "Strike Before It Bites"

Purpose

Emergencies during sUAS operations can occur suddenly due to equipment failure, interference, environmental conditions, or human error. This toolbox talk provides a comprehensive overview of FAA Part 107 emergency requirements, industrial mishap response expectations, and crew resource management techniques to ensure safe, controlled recovery during unexpected events.
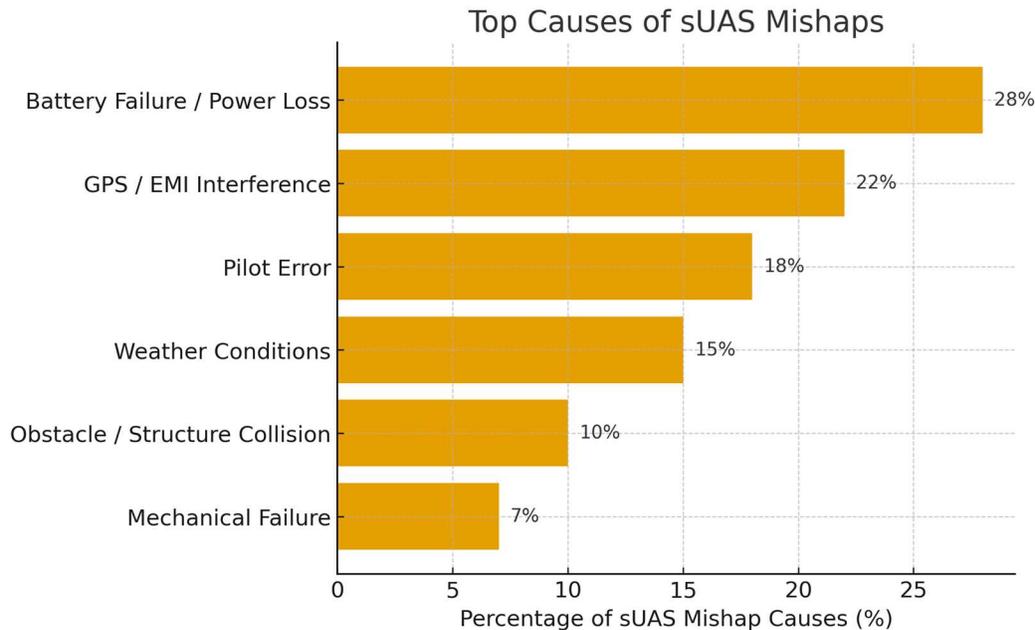

Figure 1 – Top Causes of sUAS Mishaps

FAA Part 107 Emergency Requirements

FAA regulations require remote pilots to maintain control and prioritize safety during any unexpected aircraft behavior:

- Remote Pilot in Command (RPIC) must take immediate action to avoid hazards to people or property.
- Lost-link procedures must be understood and tested before flight.

- Emergency deviations from Part 107 are permitted but must be documented.
- Post-incident reporting to the FAA is required if injuries or significant property damage occur.

Industrial and Utility Mishap Considerations

Industrial inspection environments introduce unique hazards that may influence emergency response actions:

- High-voltage facilities may interfere with GPS, magnetometers, and control signals.
- Metal structures can cause unpredictable reflections of RC signals.
- Thermal plumes from boilers, HRSGs, or process vents can destabilize aircraft.
- Forced landing areas may be limited due to energized equipment or restricted zones.

Crew Resource Management in Emergencies

Strong coordination between the RPIC, Visual Observer (VO), and support personnel improves emergency response effectiveness:

- Use clear, concise communication during emergencies—avoid unnecessary dialogue.
- VO must announce hazards such as birds, aircraft, or obstacles immediately.
- RPIC should verbalize corrective actions so the VO can confirm aircraft behavior.
- Pre-established communication protocols reduce confusion during high workload events.

Lost-Link and Flyaway Procedures

Loss of command and control link requires quick diagnosis and appropriate emergency action:

- Verify if the issue is caused by EMI or terrain obstruction.
- Observe whether the aircraft executes its programmed Return-to-Home (RTH).
- If RTH behavior is unsafe, override and manually steer if control is regained.
- Notify site personnel if the aircraft is moving toward hazardous or restricted areas.

Battery Failure and Power-Loss Response

Sudden battery voltage drops or power loss require immediate corrective action:

- Monitor voltage during flight and return early if unexpected drop is observed.
- If critical battery warning occurs, land immediately in the nearest safe zone.
- Do not rely solely on automatic RTH—manual landing may be safer.

- Prepare for hard landing if aircraft descends faster than expected due to low voltage.

Collision or Near-Miss Response

Collisions or contact with structures require controlled shutdown and documentation:

- Immediately cut throttle if the drone becomes entangled or impacts a structure.
- If the aircraft falls into a restricted or energized area, do NOT attempt retrieval without site authorization.
- Inspect all motors, propellers, arms, and battery before any future flights.
- Document the event and report to site supervision.

Forced Landing Procedures

When continued flight is unsafe, a controlled forced landing may be necessary:

- Identify safe landing zones before flight begins.
- Avoid landing near people, vehicles, or energized infrastructure.
- Announce forced landing to the VO and on-site personnel.
- Maintain control as long as possible to minimize impact forces.

Post-Incident Reporting and Recovery

After an emergency, proper reporting and recovery ensure safety and regulatory compliance:

- Secure the aircraft and battery to prevent secondary hazards.
- Capture telemetry data, logs, and video for review.
- Follow RATTLIR incident documentation procedures.
- Report qualifying events to the FAA when required.

Discussion Questions

- Do you understand the emergency actions required for lost link, battery failure, or flyaway events?
- Are you aware of the industrial hazards that may affect emergency responses at today's site?
- Do you have a clear communication protocol established with your VO before takeoff?

RATTLIR Takeaway

Emergencies are inevitable in sUAS operations, but their impact can be minimized through disciplined procedures, strong communication, and situational awareness. Pilots must prioritize safety over mission objectives and respond deliberately to equipment failures, interference, weather, or unexpected hazards. RATTLIR strikes before it bites by ensuring every crew member is prepared, coordinated, and ready to act when seconds matter.