



FLYING NEAR UTILITIES & CRITICAL INFRASTRUCTURE

TOOLBOX TALK: Flying Near Utilities & Critical Infrastructure

RATTLIR Safety Series – "Strike Before It Bites"

Purpose

Flying sUAS near electrical utilities and industrial infrastructure requires strict hazard awareness due to electromagnetic interference, energized equipment, GPS degradation, thermal plumes, and tight operating spaces. This toolbox talk combines FAA operational rules, utility-specific hazards, industrial conditions, and human-performance considerations to ensure safe drone operations around critical assets.





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Electrical Utility Hazards

Electrical utilities present unique electromagnetic and physical hazards that can disrupt drone control or pose shock risks:

- High-voltage lines create strong electromagnetic fields that interfere with GPS, compasses, and radio systems.
- Transformers, breakers, and bus systems emit EMI/RFI that can cause ATTI mode transitions or control latency.
- Metallic structures can distort RC signals and cause unexpected aircraft drift or yaw.
- Induced voltage can accumulate on the aircraft airframe when flying too close to energized equipment.

Industrial and Process Infrastructure Hazards

Industrial facilities introduce mechanical, thermal, and structural hazards that require careful flight path planning:

- Boiler exhaust, HRSG vents, and process stacks create powerful upward and lateral thermal plumes.
- Cooling towers generate strong air currents and unpredictable turbulence.
- Cranes, conveyors, and tall structures reduce maneuvering room and increase collision risk.
- Tank farms and pipelines have restricted access zones and may be classified as sensitive assets.

FAA Operational Constraints Near Infrastructure

Flying near infrastructure must comply with FAA Part 107 regulations and airspace requirements:

- Maintain Visual Line of Sight (VLOS) at all times to detect hazards quickly.
- Remain below 400 feet AGL unless operating within 400 feet of a structure.
- Check for Temporary Flight Restrictions (TFRs) near power plants or utility repair zones.
- Ensure anti-collision lighting is installed and active for night operations.

Crew Communication and Coordination

Crew Resource Management improves hazard detection and response near utilities and industrial assets:



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- Use clear, concise communication between RPIC and VO during complex flight paths.
- VO should announce EMI indicators, drift, birds, or unexpected aircraft motion immediately.
- RPIC must verbalize control inputs so the VO can confirm aircraft behavior matches commands.

Standoff Distances and Flight Path Planning

Maintaining proper distance from energized and industrial equipment reduces risk of interference or collision:

- Maintain a conservative horizontal offset from high-voltage structures to reduce EMI and induced voltage risk.
- Avoid flying directly above energized lines or substations unless required by mission planning.
- Plan flight paths with lateral buffers from structures to prevent signal reflection and drift.
- Use slow, deliberate maneuvers when flying near steel or metallic infrastructure.

Emergency Considerations Near Utilities

Emergency events near infrastructure require immediate hazard recognition and controlled responses:

- If GPS loss occurs, maintain manual control and increase distance from energized equipment.
- If aircraft begins to drift, climb and retreat to a safe offset zone.
- In the event of a flyaway, notify utility personnel and secure the area beneath the flight path.
- Do not attempt recovery from energized areas – utility clearance and LOTO may be required.

Discussion Questions

- Do you understand the EMI, GPS degradation, and thermal hazards present near utility structures?
- Are you aware of proper standoff distances and flight path planning around today's infrastructure?
- Do you have a clear communication plan with your Visual Observer before flying near utilities?



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RATTLIR Takeaway

Flying near electrical utilities and industrial infrastructure demands deliberate planning, situational awareness, and strong communication. EMI, GPS loss, and induced voltage can occur without warning, requiring pilots to use conservative standoff distances and controlled maneuvers. RATTLIR strikes before it bites by promoting proactive hazard identification, disciplined crew coordination, and safe flight practices around high-risk assets.