



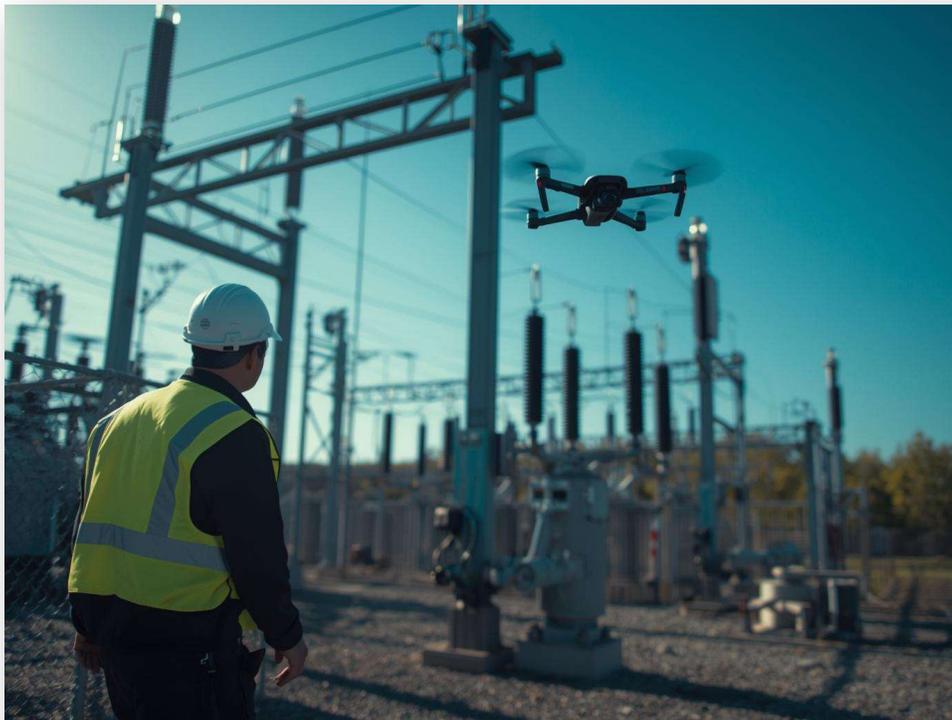
# LINE OF SIGHT – SITUATIONAL AWARENESS

## TOOLBOX TALK: Line of Sight (LOS) and Situational Awareness

RATTLIR Safety Series – "Strike Before It Bites"

### Purpose

Maintaining Visual Line of Sight (VLOS) and situational awareness is a core requirement of FAA Part 107 and a critical safety factor during sUAS operations. Industrial environments further increase LOS challenges due to structures, equipment, electromagnetic interference, and human-performance demands. This toolbox talk explains LOS requirements, infrastructure-related hazards, and techniques to maintain full situational awareness.



### FAA Requirements for Maintaining Visual Line of Sight

FAA Part 107 requires the Remote Pilot in Command (RPIC) or Visual Observer (VO) to maintain uninterrupted VLOS during flight:

- The aircraft must be visible at all times without visual aids (binoculars or FPV-only operation).



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- The RPIC or VO must be able to determine aircraft orientation, altitude, and direction at all times.
- LOS must allow immediate ability to maneuver and avoid hazards.
- Flying behind obstacles, structures, or terrain is prohibited if LOS is lost.

## **Beyond Visual Line of Sight (BVLOS) Waiver Requirements**

Certain inspection missions, including long-distance power line, transmission corridor, and gas pipeline inspections, may require the aircraft to operate beyond the pilot's visual line of sight. FAA Part 107 prohibits BVLOS flight unless the operator has received an approved FAA waiver outlining the operations, mitigation strategies, crew procedures, and safety case.

## **Industrial and Utility LOS Hazards**

Industrial and utility environments reduce visibility and increase LOS challenges due to equipment, structures, and environmental conditions:

- Buildings, tanks, transformers, and substation equipment create blind spots and occlusion hazards.
- Cranes, conveyors, vehicles, and personnel movement create dynamic obstruction risks.
- Thermal plumes and exhaust vents may cause aircraft drift, requiring continuous LOS verification.
- Metallic structures can induce unexpected aircraft behavior, making LOS essential for rapid correction.

## **Principles of Situational Awareness**

Situational awareness requires perceiving the environment, understanding changes, and predicting future aircraft behavior:

- Continuously scan the airspace, flight path, personnel movement, and obstacles.
- Monitor aircraft attitude, altitude, and drift – especially during windy or EMI-heavy conditions.
- Recognize early signs of degraded control such as lag, drift, or orientation uncertainty.
- Maintain awareness of environmental factors including wind direction, sun glare, and weather changes.

## **Human-Performance Traps Affecting LOS and Awareness**

Human factors can reduce LOS effectiveness and increase risk when operating drones around critical infrastructure:



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- Task saturation from camera control, data capture, or navigation tasks.
- Complacency during repetitive inspection missions.
- Narrowed attention during close-proximity flights near structures.
- Fatigue or daylight glare reducing visual clarity.

## **RPIC and Visual Observer (VO) Coordination**

Effective coordination between RPIC and VO ensures sustained LOS and hazard detection:

- The VO should maintain broad airspace scanning, watching for aircraft, birds, or obstacles.
- The RPIC should verbalize intended maneuvers so the VO can anticipate aircraft motion.
- Use three-way communication for flight path changes, emergencies, and hazard calls.
- Position the VO at strategic vantage points to avoid LOS occlusion during complex missions.

## **Best Practices for Maintaining LOS and Situational Awareness**

Applying disciplined LOS habits ensures safe and compliant flight operations:

- Avoid placing the aircraft between structures or flying behind obstacles.
- Increase standoff distance near towers, tanks, substations, or cranes.
- Reposition yourself or the VO before continuing flight if LOS becomes limited.
- Pause operations immediately if LOS is lost and reposition the aircraft to regain visibility.

## **Discussion Questions**

- Do you understand FAA LOS requirements and BVLOS waiver rules?
- Are you aware of LOS hazards present in today's industrial or utility environment?
- Do you have a clear RPIC–VO communication plan established before flight?

## **RATTLIR Takeaway**

Maintaining LOS and situational awareness is essential for detecting hazards, preventing drift-related collisions, and responding quickly to unexpected aircraft behavior. Industrial environments increase LOS challenges due to structures, EMI, and dynamic activity. When LOS cannot be maintained, FAA BVLOS authorization is required. RATTLIR strikes before it bites by promoting disciplined scanning, strong team communication, and proactive LOS management for every mission.