

The Rising Risk of Drone and Laser Strikes

Numerous recent articles have been published describing the increasing frequency of both laser strikes and drone sightings. While these articles often cover the entire NAS, we thought it would be beneficial for NY operators to know what is transpiring in the NY-NJ airspace.

The purpose of this paper is to help raise pilot awareness, provide guidance for pilots should they have an encounter, suggest mitigation strategies, and detail reporting requirements. In addition, we've specified the steps, including punitive measures, that the FAA has implemented to mitigate and deter these events. Please note that, when referring to drones, the FAA uses the term Unmanned Aircraft Sightings (UAS), and we'll consistently utilize this acronym throughout. We'll use UAV to denote Unmanned Aerial Vehicles. All of the following data was compiled from the FAA's website.

Unmanned Aircraft Sightings (UAS)

The FAA has received a drastic increase in UAS reports from pilots, citizens and law enforcement. The agency wants to send out a clear message that operating drones in the immediate vicinity of airplanes, helicopters and airports is dangerous and illegal. Unauthorized operators may be subject to stiff fines and criminal charges, to include possible jail time. The FAA encourages the public to report unauthorized drone operations to local law enforcement in an effort to discourage this dangerous, illegal activity.

The following table is a summary of UAS reports compiled from the FAA UAS Sighting Report data arranged by fiscal year. For perspective, the table provides incident data that encompasses the entire NAS, as well as data specific to New York and New Jersey (NY-NJ). Click [here](#) to see the FAA's UAS Report website.

	Q1 NAS/NY- NJ	Q2 NAS/NY- NJ	Q3 NAS/NY- NJ	Q4 NAS/NY- NJ	Total in NAS	Avg/Qtr in NAS	Total in NY- NJ	NY-NJ % NAS
2021	367/21	466/22	958/88	----	1791	597	131	7.3
2020	382/35	374/26	409/24	487/53	1652	413	141	8.5
2019	404/40	458/39	715/101	601/78	2178	544	258	11.9
2018	426/51	452/37	785/128	671/102	2334	584	318	13.6
2017	399/41	404/24	660/90	636/121	2099	525	276	13.2

The following are some observations derived from this data, as well as from the report summaries:

- Due to the pandemic, FY 2020 saw a decrease in reported UAS events.
- This past quarter(FY 2021 Q3) saw the highest reported UAS events of any quarter in the past 5 years.

- On a positive note, NY-NJ UAS event percentage has been decreasing for the past 3 years.
- The majority of the reported sightings in NY-NJ airspace occurred between 1500 – 4000 ft. However, some reported events were as low as 300 feet and some as high as 17,000 feet.
- The majority of UAS reports were made by commercial airline pilots.
- Based on pilot reports, UAVs come in all colors, with white and black being the most predominant.
- Visually acquiring UAVs is challenging, as most are 3 feet or less in diameter and do not transmit an International Friend or Foe (IFF) signal.

While actual UAV strikes are rare, the following report summaries highlight some of the more dramatic UAS encounters in NY-NJ Airspace:

- 2017
 - A drone was found on Rwy 22R at JFK.
 - An Airbus A319 took evasive action while being vectored at 3,000', 12nm southwest of LGA.
- 2018
 - A Cessna 182 took evasive action to avoid a collision with a drone while at 6,500', 15nm south of JFK
 - A Boeing 777 took evasive action to avoid a collision with a drone while at 8,500', 5nm south of ISP. The pilot reported missing the drone by 20'.
- 2019
 - A Boeing 737 took evasive action to avoid a collision with a drone while overhead TEB at 3,500' on approach to EWR 22L. The drone came within 30' of the aircraft. As a result N90 changed the active EWR approach to Rwy 11, triggering a ground stop, airborne holding, and 6 inbound diversions due to fuel issues.
 - A Challenger 350 took evasive action while at 2,600', 5nm southwest of LGA while being vectored for approach to LGA Rwy 04.
 - LGA Tower delayed departures due to a drone flying off the departure end of the runway.
 - An Embraer E190 took evasive action while at 5,500', 7nm south of JFK.
 - A Helicopter took evasive action while at 600', 7nm west of JFK, avoiding a drone by less than 50'.
- 2020
 - An Airbus A321 took evasive action at 900', 2nm north east of LGA.
- 2021
 - A Piper Cherokee PA28A took evasive action at 1500', 3nm south west of RME. Closest Point of Approach (CPA) to the drone was 100'.
 - UH-60 Black Hawk helicopter struck a UAV while at 500', 7nm south east of EWR. The drone strike was observed by another UH-60 that was flying in formation. The damaged helicopter continued to its destination without

further incident, but post-flight inspection revealed substantial damage to two rotor blades.

In order to mitigate UAV collision risk, the FAA is working to fully integrate drones into the NAS, and has developed a UAV Remote Identification (Remote ID) program to assist in this endeavor. Remote ID will transmit the drone's identification and location information to other parties. Unfortunately, Remote ID broadcast is incompatible with TCAS, so pilots must not only remain vigilant but also rely on ATC to provide UAV warnings.

The FAA published the final rule with corrections on April 21st, 2021. Manufacturers and producers of UAV drones must comply with the final rule's requirements by September 16th, 2022. Commercial and recreational UAV drone pilots must satisfy by September 16th, 2023 one of the three following methods of compliance.

1. [Operate a Standard Remote ID Drone](#) that broadcasts identification and location information of the drone and control station. A standard remote ID drone is one that is produced with built-in remote ID broadcast capabilities.
2. [Operate a drone with a remote ID broadcast module](#) giving the drone's identification, location, and take-off information. A broadcast module is a device that can be attached to a drone, or a feature (such as a software upgrade) integrated with the drone. Persons operating a drone with a remote ID broadcast module must be able to see their drone at all times during flight.
3. [Operate \(without remote ID equipment\)](#) at FAA-Recognized Identification Areas (FRIAs) sponsored by community-based organizations or schools. FRIAs are the only locations UAVs (drones and radio-controlled airplanes) may operate without broadcasting remote ID message elements.

While the FAA is working hard to alleviate this threat, UAVs are here to stay, and mitigation strategy implementation remains several years away. Pilots need to remain vigilant and know how to report UAS encounters:

- Report the incident to the controlling ATC agency, and be prepared to provide the following:
 - Location of encounter
 - Relative bearing and altitude of UAV
 - Evasive action taken, if any
- The controlling agency may relay your information to law enforcement for further action.

Laser Strikes

The FAA remains steadfast in its campaign to heighten public awareness of the serious safety risk posed by lasers pointed at aircraft. Intentionally aiming lasers at aircraft poses a serious safety threat to pilots and violates federal law. High-powered lasers can incapacitate pilots while they are flying and potentially cause serious eye injury.

The FAA works closely with federal, state and local law enforcement agencies to pursue civil and criminal penalties against people who purposely aim a laser at an aircraft. The agency takes enforcement action against people who violate Federal Aviation Regulations by shining lasers at aircraft, and can impose civil penalties of up to \$11,000 per violation.

The FAA reported 6,852 laser incidents in 2020, up from 6,136 in 2019, which is concerning since air traffic greatly decreased during the pandemic. This is the highest reported number of incidents since 2016, as can be seen in the table below. Fortunately, NY-NJ airspace has experienced a steady decrease in reported laser events since 2018.

Year	Total in NAS	NY-NJ Airports
2021 through 31 July	5079	103
2020	6852	183
2019	6136	220
2018	5663	248
2017	6754	218
2016	7398	315

Per [FAA Advisory Circular \(AC\) 70-2A, Reporting of laser illumination of aircraft](#), all pilots and crewmembers are requested to immediately report incidents of unauthorized laser illumination by radio to the appropriate ATC controlling facility. Upon arrival at destination, all pilots and crewmembers affected by an unauthorized laser illumination are requested to complete the FAA Laser Beam Incident Reporting Form found [here](#).

A pilot who encounters a laser strike should consider the following guidance:

- Fly the plane. Re-engage the autopilot (if disengaged) or transfer control to the other pilot if that individual has not been affected by the laser strike.
- Do not look directly toward the light.
- If possible, block the light with a hand or clipboard, or maneuver the plane.
- Turn up the cockpit lights, as light-adapted eyes are less prone to the effects of a laser.
- Resist the urge to rub your eyes, as this can lead to irritation and may cause tearing or corneal abrasion.

Like UAV encounters, laser strikes will likely continue to pose a serious threat to aircrew. Therefore, flight departments and pilots should develop mitigation strategies against laser strikes. The following are some recommended strategies:

- Consider carrying protective eyewear in the flight station. This protective eyewear can be easily and cheaply acquired.

- When flying in an area where laser strikes have been prevalent or suspected, these anti-laser glasses should be readily available in the cockpit for immediate use.