Flying over the Public: Why You Should Know over Whom and What

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Introduction

FAA is taking the first real step forward toward integrating UAS operations into the National Airspace System (NAS).

By Notice published on February 13, 2019[1], FAA is proposing to allow small UAS, under stated conditions, to fly over members of the public without a waiver. In general, the NPRM recognizes the reality that small UAS (Categories 1 and 2) are, or can be made, not likely to cause significant harm to people and property on the ground, and if so can operate with an acceptable level of safety under blanket approval based solely on their physical properties. As the aircraft increases in size and weight in Category 3 however, the potential increases for significant injury and damage to the public, and therefore FAA is imposing some operational precautions beyond physical innocuousness of the aircraft.[2]

Primary concern for people and property under the route of flight, as reflected in this NPRM, is new for the FAA. Historically, manned aircraft takeoff and land on unpopulated airport facilities and fly mainly in transit mode, under positive control over regular routings. As a result, death and injury to passengers and crews has been the main concern, while injury and damage to persons and property on the ground have proved statistically insignificant.[3] UAVs in contrast have no passengers or onboard crew to be concerned about. And they fly random paths, often traversing or hovering over lots of people and over all manner of ground environments, primarily private property. Therefore, their primary inherent safety risk is injury and damage to the general public and property on the ground.

This disparity in primary risk concern between manned and unmanned aircraft is a distinction with considerable difference for UAS operators. First, protection of the public on the ground (versus passengers and crew) will be the most important factor in FAA UAS certification and operational approval decisions. Second, UAS operators will face potential third-party liability risks very different in character from those applicable to manned aircraft operations, which will have to be accounted for in financial precautions and flight planning.

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[1] 84 Fed. Reg. 3856

[2] The NPRM therefore proposes that: Category 3 UAS will be prohibited from flying over open air assemblies of people; or if they do operate over groups of people, those people need to be in an enclosed area and informed that UAS will be overflying; or that the UAV either not perform sustained flight over them, or that they be under a protective structure.

[3] *See* "Common Risk Criteria Standards [321-07] for National Test Ranges: Supplement," pp. 5-34/38 (2007).

Ground Injury and Damage Risk as the Primary Factor in Regulatory Approvals

FAA has tentatively concluded that Categories 1 and 2 small UAVs can be made sufficiently harmless, through structure alone to fly under blanket approval over the general public with an acceptable level of injury or damage risk. Category 3 aircraft can fly under blanket approval on the basis of aircraft physical structure combined with operating restrictions. Some Category 3 operators may be able and willing to accept those operating limitations, namely avoiding populated areas, or controlling the ground environment over which they are flying. But the commercial vision for UAS is far more ambitious: Non-pilot dispatchers each managing batches of pre-programmed, fully automated vehicles flying beyond the line of sight. For these missions, conditions stated in the NPRM are far too limiting or impossible.

Moving beyond Category 3 aircraft to more aggressive missions and larger aircraft, operators who are not eligible for blanket approval will have to be prepared to demonstrate to FAA that their operations can be performed with an "acceptable" level of safety.

Because of their great physical and operational diversity, it will be very difficult, if not impossible, for FAA to rely on traditional prescriptive standards to judge the safety of specific UAS. Instead, FAA's small UAS NPRM introduces the innovative concept of certification/regulation by proponent-proffered safety cases. And for the first time, FAA is considering protection of the people and property on the ground--versus passenger/crew safety—as the primary consideration.

FAA continues to have a proactive role in this process going forward. It's time—past time—for FAA to establish and declare on what basis and under what conditions generally it will consider UAS flights over the non-participating public "acceptably safe." Experts, among them the authors, have recommended that FAA consider as "acceptably safe" those operations that can be performed at a level of accidents and mishaps already prevailing in the subject piece of airspace (Target Level of Safety (TLS)),[4] which it can be assumed the public already considers reasonably safe.[5]

To implement this standard, a proponent for UAS operations should be prepared to proffer a two-part safety case. First, the proponent should demonstrate reliability/integrity of its vehicle and operation equivalent to the prevailing TLS in that area.[6] But second, the safety case should also contain a plan for protecting the public from any harm or damage that might occur as a result of the operation. This second element of the safety case would include: 1) a granular

[4] Matthews, et al., "An Achievable Path to UAS Integration in the NAS", https://www.safeaccess4uas.com/paper-uas-integration-nas.html ; FAA Sponsored Sense and Avoid Workshop, "Sense and Avoid (SAA) for Unmanned Aircraft Systems (UAS), Second Caucus Workshop Report," January 18, 2013.
[5] FAA Order 1100.161 CHG 1, https://www.faa.gov/documentLibrary/media/Order/Order_1100.161_CHG_1.pdf
[6] Manufacturers may fulfill this role by testing, documenting results, and certifying aircraft types and models for reliability/integrity, etc. under stated operating parameters, which can be matched to the TLS in the proposed area of operation.

analysis and estimation of the environment, including population and property, overflown[7], (2) a showing that the operator has engaged to the extent possible in comparative route analysis and flight planning that minimizes the risk, and (3) that the operator is financially capable, or has in place an insurance vehicle adequate to compensate any third parties who are injured or damaged if the flight goes awry.[8]

UAS Operators' Third-Party Liability to Anyone Injured or Damaged

Airlines are liable to passengers under the normal rules of tort liability, which require the injured parties on US domestic flights to show that the airline was negligent or otherwise at fault in order to recover damages for death or injury resulting from a crash or mishap. Under international agreements[9], passengers on international flights and their representatives can recover limited amounts of damages without proving negligence or fault of the operator. For airlines or other passenger carrying aircraft, the number and characteristics of passengers—and thus their primary potential liability for injury and death—are known or fairly easily calculable, and insurable.

By contrast, some jurisdictions may apply the common law rule of strict liability for persons and property on the ground who are injured or damaged by aircraft.[10] This means that in those places the operator of the aircraft--especially a UAV which at this point is a fairly new and innovative technology for many users--is fully liable without dollar limitations, regardless whether or not the operator is negligent or at fault. In short, in many places there will be no such thing as a non-compensable UAS "accident". And FAA's new rule requiring UAS to display registration information on the outside of the airframe is going to make it much easier for persons aggrieved to identify and pursue the owner of an offending aircraft. Consequently, UAS operators must be prepared to pay members of the public for any and all loss or damage caused by their vehicle, regardless of how careful or faultless their operation, even if the accident or mishap is caused by bad weather or other natural phenomenon. And UAS operators cannot necessarily rely on the aircraft manufacturer to assume liability or make good

[7] Data for such calculations exists, but tools for extracting such information and associating it with specific aircraft routings are only now under development.

[8] FAA completes and enforces that protective construct through its new rule requiring that the UAS registration be prominently displayed on the outside of the vehicle. This measure will allow any aggrieved member of the public to itself identify the offending aircraft and operator, and seek redress from any insurance coverage in place, or if necessary in court under legal tort liability principals.

[9] *See* "Airplane Accidents", https://www.justia.com/injury/motor-vehicle-accidents/airplane-accidents/; "Liability in Plane Crashes," https://planecrashlawyersnetwork.com/liability/

[10] *See* Geoffrey Christopher Rapp, *Unmanned Aerial Exposure: Civil Liability Concerns Arising From Domestic Law Enforcement Employment of Unmanned Aerial Systems,* 85 UND L. R. 623 (2009), https://law.und.edu/_files/docs/ndlr/pdf/issues/85/3/85ndlr623.pdf ; David I. Levine and Carel J. Stolker, *Compensation for Damage to Parties on the Ground as a Result of Aviation Accidents,* 22 Air & Space L. 60 (1997), http://repository.uchastings.edu/faculty_scholarship/1330 ; William L. Prosser, *Law of Torts (4th Ed.)* pp.514-516 (1971); Lawrence Vold, *Strict Liability for Aircraft Crashes and Forced Landings on Ground Victims Outside of Established Landing Areas,* 5 Hastings L.J. 1 (1953), https://repository.uchastings/hastings_law_journal/vol5/iss1/1 ; *cf.* William C. Wolff, *Liability of Aircraft Owners and Operators for Ground Injury,* 24 J. Air. L. & Com. 203 (1957), https://scholar.smu.edu/jalc/vol24/iss2/4/

on a damage claim when a mishap occurs. The injured party's first recourse for a lawsuit is always the aircraft operator. Only if and when the operator proves that a defect in the aircraft led to the mishap can he or she recover the damage claim loss from the manufacturer.

Under such circumstances, UAS operators clearly face significant financial jeopardy. Only the most financially capable operators, or those who can somehow be sure that they are flying over completely open territory, should risk flying without some sort of third-party liability insurance coverage. But without specific information about ground assets under specific flight paths, operators cannot be sure that the area below is risk-free, and insurance underwriting has to cover the highest potential injury and damage risks within the aircraft's general area of operations and performance capabilities. Drone insurance is becoming more and more available, but without much historical loss information or precise information about ground assets at risk it is difficult to assess correctly what is the right coverage for a particular flight. Under these circumstances, UAS operators are potentially flying under-insured, or may be paying for costly over-insurance.

The authors suggest that the best way to protect the public from harm, reduce the risk of liability for UAS operators, and "right size" their insurance coverage is to get smarter about who and what is on the ground beneath specific flight paths. This information will allow operators to flight plan around the highest risk routings, and to have in place insurance coverage sufficient to compensate anyone injured or damaged, without incurring unnecessary costs by over-insuring. It is hoped that insurers will use this information for more precise risk analysis that minimizes insurance premiums for lower risk operations, and offer the more innovative and accessible coverages such as per flight insurance.

Estimating the third-party liability risk to people and property on the ground under specific flight paths is, however, complicated. UAS routes overfly people of all ages, in all stages and walks of life, and private property of variable value. The potential loss risk over specific routings can vary widely. Data for such calculations exists, but tools for extracting such information and associating it with specific aircraft routings are only now under development.

Washington Progress Group LLC is a consulting firm consisting of senior aviation, policy, and legal subject matter experts with specific expertise in UAS technology and technology policy. In addition to providing thought leadership within the UAS community, WPG is an active participant in NASA's UTM planning activities, and has under development an innovative proprietary tool improving risk analysis not only for UAS, but applicable to other aviation sectors, from general and commercial aviation to commercial space operations.