



RADIO TELEVISION DIGITAL NEWS ASSOCIATION

Visibility, Advocacy, Training, Resources, Networking and Awards for Electronic Journalists

Squeezed out of the sky

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• **By Henry H. Perritt, Jr.**

Much of the current fascination with civilian drones was stimulated by a November, 2013, CBS 60 Minutes interview with Jeff Bezos, the CEO of Amazon, in which he promised that drones eventually will deliver packages to Amazon's customers. Now, Amazon has released two white papers explaining how this might work.

The proposal suggests both opportunities and obstacles to digital journalism.

Under its proposal, microdrones (small unmanned aircraft systems, or "sUAS") would fly in segregated airspace below 500 feet, and machodrones (larger UAS, weighing more than 55 pounds) would be integrated into non-segregated civil airspace above 500 feet where most civil and military aviation activities occur.

The microdrone proposal involves four height segments. Airspace below 200 feet is the *Low-Speed Localized Traffic Area*. It is reserved for localized operations such as newsgathering, surveying, event photography, and inspection, and operations for lesser-equipped vehicles, e.g. ones without sophisticated sense-and-avoid (SAA) technology. It would exclude heavily-populated areas.

Airspace between 200 and 400 feet is the *High-Speed Transit Area*. It is reserved for vehicles with more sophisticated SAA systems operating under Internet-based command and control.

Airspace between 400 and 500 feet is a permanent *No Fly Zone*. Microdrone operators will not be

permitted to fly there, except in emergencies.

In addition, the FAA or local authorities can establish *Predefined Low Risk Locations* to accommodate special uses such as airfields for model aircraft organizations, where members meet pre-established parameters for altitude and drone systems.

The central features of the proposals tie airspace access to vehicle capability and segregate microdrones from current aviation operations.

The proposal establishes four classes of vehicle:

- “Basic” vehicles would have radio control and nothing else. They would be relegated to daytime, line of sight operations in Predefined Low Risk Locations.
- “Good” vehicles would have radio control and the ability to announce and log identity, location, and activity via a system of vehicle-to-vehicle (“V2V”) communication and to receive air traffic and weather data. They would rely on GPS, WiFi, and cell-tower information to determine position, and would be navigated and controlled through an Internet-linked flight planning system. Operators would be alerted to potential airspace conflicts through the collaborative V2V communications combined with geospatial data. They would be permitted unrestricted daytime line-of-sight operations in the Low Speed Localized Traffic Area.
- “Better” vehicles would have the capabilities of “good” vehicles and, in addition, have autopilots capable of collision avoidance relying on collaborative V2V data exchange, on-vehicle Internet connectivity, and ADS-B out capability. They apparently (the proposal is not clear on this) would have access to the High Speed Transit space, possibly subject to certain restrictions in urban areas.
- “Best” vehicles would have the capabilities of “better” vehicles and, in addition, have access to geospatial data on all hazards to navigation over a certain height, the capability to select alternate landing sites, and SAA technology to support collision avoidance with stationary objects as well as moving targets lacking V2V capability. They would be permitted unrestricted beyond-line-of-sight (“BLOS”) operations anywhere below the No Fly Zone, day or night, in all weather conditions. Vehicle-to-vehicle (“V2V”) communications capability enables collaboration between vehicles to create awareness and maintain separation.

To be sure, Amazon’s proposal is not law; it is merely a proposal by one participant in the growing debate over civilian drones. Amazon itself admits that the details of its proposal will be molded through discussion and negotiation with other interests. Indeed, its proposal is conceptual in nature, without yet providing many implementation details. It is not likely to become law anytime in the near future – too much further technology development and public debate over its radical nature will have to occur first. Some of its provisions are confusing. It is not clear, for example, what ADS-B capability adds to the V2V concept; ADS-B *is* a V2V data exchange system. But it is a concrete proposal, and everyone will have to wait a long time for the FAA’s sluggish advisory committee process to produce anything comparable in scope or boldness.

The Amazon proposal is already attracting opposition from the airplane and helicopter communities because of their perception that the airspace designated for low-level drone flight will exclude airplanes and helicopters unless they are equipped to participate in the airspace management system for the lower level airspace. This concern is valid; if the Amazon system is to provide traffic

separation between drones and manned aircraft – a capability forcefully advocated by traditional aviation interests, especially by ALPA and the cropdusters— all aircraft in the designated airspace must be similarly equipped. It may be a case of "being careful what you ask for."

Nevertheless, it is unassailable that safe operation of hundreds or thousands of drones, especially metropolitan areas, will require more technology for collision avoidance than is now available in the marketplace. Something like what Amazon has proposed is necessary. It borrows on concepts used for many years to separate IFR traffic in the national airspace system such as exclusive access by one vehicle to a block of airspace; by the railroad industry – exclusive access by one train to a block of railroad; and by computer networks using the Ethernet protocol—as almost all of them do—to avoid packet collisions. Traffic separation under the load of greatly expanded low level drone traffic is simply infeasible using conventional transponders and voice communications with ground-based ATC controllers.

In many ways, the Amazon proposal clears the air (so to speak) for more extensive newsgathering by drones.

Implementation of the proposal would drive up the cost of microdrones, but it is not clear by how much. All of the technology it requires already exists in some form, except for comprehensive automatic collision avoidance, which is still in the concept-development and prototyping stage. The biggest technology issue is whether the FAA finds a way to avoid the burdens, delays, and innovation-stifling effects of traditional airworthiness certification by relying on performance, rather than design, standards; by relying on vendor self-certification; and by assuring reliability based on actual flight data rather than extensive pre-sale testing.

If something along the lines of what Amazon has proposed is eventually implemented, it could have the following, conflicting, effects on aerial newsgathering:

It would facilitate access by more sophisticated newsgathering drones, by allowing them to operate anywhere, including congested urban areas, and to operate at night and beyond the line of sight of the drone operator ("DROP")—activities not permitted by the FAA's NPRM or by the terms of the 1,000 section 333 exemptions granted so far. The same airspace management system that it contemplates to allow safe package delivery by hundreds or thousands of small drones is well-suited for managing groups of newsgathering drones programmed to cover traffic and major events. Drones could be programmed to fly the routine routes that traffic helicopters fly every day during rush hours to collect the video that is a mainstay of television news programming in larger metropolitan areas.

On the other hand, as written, it would exclude the lowest-cost newsgathering drones from urban areas where most news is generated.

It provides few answers for drone coverage of breaking news. There, the barriers are not only traffic separation, but the limited endurance of electrically powered drones and the associated need for a multiplicity of launch and recovery sites to permit the drone to get to where the news is breaking and to land every few minutes for battery swapping. It does, however, offer the prospect of wider use of stringers equipped with low-cost drones having only what Amazon calls "basic" capability. They

would have to fly below 200 feet, but that is high enough to get good aerial imagery of things like highway accidents, fires, natural disasters, and law-enforcement standoffs.

It could exclude news helicopters from some of the low-level airspace in which they now occasionally operate. A footnote in one of the white papers says that the proposed airspace would be exclusive for drones. If that concept is adopted, it would relegate newsgathering helicopters to the airspace above 500 feet, but that's where they fly most of the time, anyway to allow for successful autorotation if the engine quits or to recover from vortex ring state, an aeronautical phenomenon that can develop quickly and result of loss of control when a helicopter hovers in adverse conditions. But news helicopters *do* sometimes fly below 500 feet, at least briefly, to get just the right shot, and their capabilities would be limited if they must stay above that level.

A more probable interpretation of the Amazon proposal is that helicopters and airplanes would be allowed in the reserved airspace below 500 feet if and only if they have traffic separation equipment similar to that required of drones. Then, the question is whether ENG helicopter contractors and the stations that purchase their services will spend the money necessary to equip their helicopters to operate in the new airspace regime. If they do, then news outlets will have the best of both worlds: they can decide on purely rational grounds when news is best covered by a helicopter, and when it is best covered by a drone.

If they don't, it will have the effect of shifting the aerial ENG market away from helicopters and toward drones – how much is hard to say. For the foreseeable future, helicopters will have the advantage of speed and range over small drones.

The journalism community must weigh in and help shape evolution of the Amazon proposals, recognizing that some implementations of it could have seriously negative effects on aerial newsgathering, but that other implementations could be just what the community has been seeking to allow wider use of this revolutionary new ENG technology.

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