



COMMON DENOMINATORS



**AIRPLANE OR DRONE, ONLY ADJECTIVES
SEPARATE PILOTS AND AIRCRAFT**

BY SCOTT M. SPANGLER

With their mushrooming popularity, drones have been the subject of a contentious aviation debate. Aviators on all sides have been arguing for as long as the FAA has been formulating its notice of proposed rulemaking (NPRM) that will regulate their commercial use and integration in the national airspace

system. Mandated by the FAA Modernization and Reform Act of 2012 (FMARA 2012), the NPRM is (in early February) undergoing its penultimate examination and review by the Office of Management and Budget. Publishing the NPRM for public comment will likely increase the debate's intensity.

T

wo words seem to lay the debate's foundation: identity politics. Simply put, it is all about the adjectives, the semantic parsing of persons, places, and things, the nouns central to our lives like "pilot" and "aircraft." Certainly, these modifiers more clearly identify our individual interests, but each adjective also divides us, pits one against the other in a world too often assessed with zero-sum metrics. As a whole, aviation is one of many minorities competing for a sustainable existence in a global marketplace. When aviators focus on their defining adjectives, it weakens aviation's collective effort to sustain its current and future viability.

If EAA has proven anything since its founding in 1953, it is that we can celebrate the aviation adjectives that define us without weakening their collective voice that defends, promotes, and propagates their shared passion for flight. It started with homebuilders. Pilots who pursued their passions in vintage, warbird, aerobatic, and ultralight aircraft soon joined them.

Now knocking on the hangar door are aircraft collectively known as drones. Following the example set

by EAA Founder Paul Poberezny, we welcome them into the vast ocean of air that is home to all who rise up from the earth's surface. Many drone pilots fly for the same reason, according to Mannie Frances—the view. The founding member of the Drone Media Group, an organization focused on drone safety, education, and training for pilots, camera operators, and hobbyists, he said the only difference is the technology involved.

First-person pilots look out the cockpit windows; ground-bound drone pilots wear video goggles that display a first-person view (FPV) from their camera-equipped drone. What unites the two is a shared love of aviation, according to Mannie, EAA 1147708.

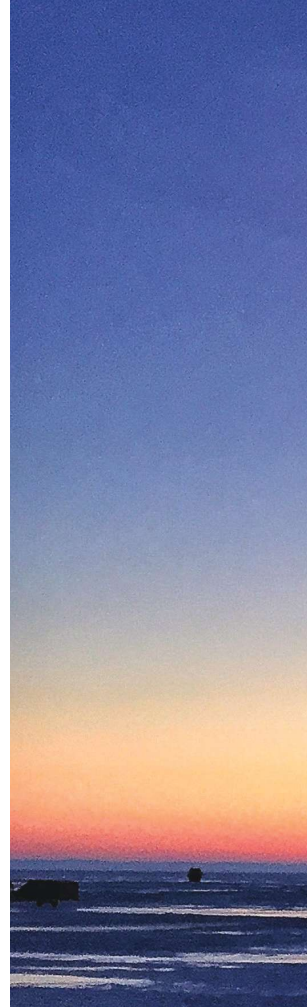
"Whether doing it for fun or for a career, a drone pilot is just as enthusiastic about skillfully piloting a drone as a traditional pilot is an airplane," he said.

Enjoying the view is not the only thing that unites the pilots of manned and unmanned aircraft. Sharing it is another.

"We are in a golden age of personal storytelling," said 3D Robotics CEO Chris Anderson, who was editor in chief of *Wired* magazine before he became a drone manufacturer.

In an online video interview recorded at the Consumer Electronics Show, where drones were a major draw this year, Chris said that with the amazing cameras available today, people want a different perspective.

It is a perspective shared by many first-person pilots; at least Sporty's Pilot Shop thinks so. In its annual report of aviation trends, it said "portable HD video cameras are hot." But then anyone paying attention to his or



The Kewaunee, Wisconsin, lighthouse from a Yuneec Q500 drone.





Yuneec Q500 drone in flight.

DRONE DEFINITIONS

In the common vernacular, drone is a synonym for a hangar-full of multisyllabic terms that include remotely piloted aircraft (RPA), unmanned aerial vehicle (UAV), and unmanned aircraft system (UAS), which is what the FAA calls them. Each term has its proponents, all of whom seem to agree that “drone” refers exclusively to military aircraft. Judging by conversations by those with no particular alliance other than aviation, most people see a drone by its dictionary definition: “a pilotless airplane that is directed in flight by remote control.” They derive its mission, military or civilian, commercial or recreational, by the context of its use.

If there is a common denominator among all of the drone synonyms, it is that they all are aircraft according to the NTSB.

In 2011, the FAA fined Raphael Pirker for the commercial and careless operation of a Riteewing Zephyr to shoot video for the University of Virginia and assessed a \$10,000 civil penalty. Raphael argued that he was not subject to aviation regulations because his drone was not an aircraft, and the administrative law judge agreed.

The FAA appealed that decision to the NTSB, and it reversed the decision.

“We must look no further than the clear, unambiguous plain language...an ‘aircraft’ is any ‘device’ used for flight in the air,” the NTSB said in its decision. “[An aircraft is] any contrivance invented, used, or designed to navigate or fly in the air.”

Following this precedent, a drone’s operator is the pilot in command because he or she is the “person who has the final authority and responsibility for the operation and safety of the flight.”

The FAA subdivides UAS operations into three categories: civil, public, and model aircraft. The forthcoming regulations apply to small UAS, meaning those that weigh no more than 55 pounds.

Civil (commercial) operations require an experimental special airworthiness certificate and accompanying operating limitations that would be familiar to any homebuilder. It prohibits operations for compensation or hire but allows research and development, flight and sales demos, and crew training. At its UAS test sites across the nation, the FAA is working with these operators to gather the technical and operational data necessary to safely integrate drones into the national airspace system.

Until the FAA rulemaking proposal is published, commented upon, revised as necessary, and made final, the FAA is authorizing drone ops on a case-by-case basis under Section 333 of the FAA Modernization and Reform Act of 2012. As of early February the FAA has approved two dozen of the hundreds of applications received, most of which carry cameras. The operating limitations require the drone pilot to hold a current private pilot and medical certificate and have a dedicated observer to ensure that the aircraft never leaves the pilot’s line of sight.

Public UAS operations require a certificate of waiver or authorization before a government entity such as public safety departments can conduct operations. Model aircraft are drones flown exclusively as a hobby or for recreation.

her aviation friends on Facebook and YouTube already knows that. Ultimately, this shared passion for perspective may very well encourage pilots to try their hands at flying others’ aircraft.

RESPONSIBILITY OF FLIGHT

Safety is another noun common in all forms of aviation, and it is an imperative concern for all who aviate. Too often born of hard and painful experience, safety is preventive knowledge promoted by self-preservation and regulatory requirements. It is learning required of all first-person pilots who must demonstrate their knowledge of it. The perception that drone pilots lack this knowledge is a fundamental concern among other pilots.

For most drone pilots, safety is a pre-eminent concern, Mannie said. Seeing and avoiding things that will down their aircraft is a universal desire, as is a desire not to fall on anyone or anything.

“There is one major difference between the manned and unmanned world: pilots absolutely do not expect to crash or want to crash,” he said. “Learning to fly a drone is a different realm; crashing happens, and drone pilots are hyper aware of it.”

But no matter what they fly, no pilot is immune to making poor decisions.

According to Mannie, one complication of the drone safety picture is their rapid transition from “novelty to spectacle to widely known curiosity to becoming widely adopted” in an environment where standardized knowledge and training requirements are absent. Technology, such as GPS-based autopilots and flight computers, makes drones easier to fly. And it can aid safety. After one of its quadcopters landed on the White House lawn, DJI issued a mandatory firmware update for its GPS-enabled flight computer that modified its no-fly zones in Washington, D.C., and around 10,000 United States airports.

Automation and digital capabilities vary among drones, according to Mannie, just as it does on manned aircraft. Like manned aircraft pilots, drone pilots should learn when to employ automation or manual controls, or a hybrid of them. In its NPRM, the FAA will likely apply the established pilot certification template of aeronautical knowledge and aircraft-specific skills for commercial drone ops. Until then, the lack of these standards makes training hard to come by, Mannie said.

KNOW BEFORE YOU FLY

BY SEAN ELLIOTT, EAA VICE PRESIDENT OF
ADVOCACY AND SAFETY

The opportunities of this new technology are obvious, but so is the dark side that involves everything from interference with regular aviation operations to personal privacy concerns. Responsible operations are paramount to the future of what the FAA now calls sUAS or small unmanned aircraft systems. General aviation pilots should not have to worry about hitting one of these during the course of a normal flight. The EAA advocacy department is paying close attention to the emerging new rules and their potential impact on general aviation.

EAA maintains a strong partnership with the Academy of Model Aeronautics. The AMA has a long-established model aircraft safety code that has been effective for decades. Many RC model clubs have flown within a few miles of very busy GA airports and have never had a problem. The difference is responsible operations through education.

EAA fully supports the recently launched "Know Before You Fly" campaign for these very reasons. The campaign brings together manufacturers and distributors to inform consumers and business users about what they need to know *before* taking to the skies. The effort includes a digital and social media campaign, point of sale materials, and pamphlets for participating manufacturers to include with their products. EAA signed on as an official supporter of this effort during the recent AMA Expo in Ontario, California, where the program was unveiled.

EAA has always stood for education and responsible freedoms in aviation. The new emerging community of drone operations should be approached in much the same way to ensure they are both welcomed into aviation and experience minimal conflicts with full-size aviation. After all, The Spirit of Aviation is welcoming to everyone with an eye toward the sky!



Yuneec Q500 drone and controller. Note different colored lights show fore and aft positioning.

In the interim, the Academy of Model Aeronautics (AMA), the Association for Unmanned Vehicle Systems International (AUVSI), and the Small UAV Coalition united to launch www.KnowBeforeYouFly.org in December 2014. It provides essential guidance for responsible, safe flight for those who fly drones for recreational, business, and public uses. EAA, NBAA, and the Consumer Electronics Association (CEA) are supporters of this effort.

The website summarizes requirements for commercial and public drone operations. The recreational flight guidelines are derived from the AMA's community-based safety guidelines, said Rich Hanson, AMA's director of government and regulatory affairs. They include keeping the model in sight at all times, seeing, avoiding and not interfering with manned aircraft operations, not intentionally flying over unprotected persons or property, and flying no higher than 400 feet above the ground.

To this last parameter, the National Agricultural Aviation Association (NAAA) would surely point out that its members operate in this same narrow layer of airspace, an arena for conflict that all drone pilots in farm country should address.

MODEL PERSPECTIVE

Drone and model aircraft employ the same technology. With some exceptions, they operate on the unlicensed frequency bands, 2.4 MHz and 5.8 MHz, which serve remotely controlled models, according to Rich. The GPS and computerized flight controls that make drones easier to fly are doing the same for traditional models as well.

"Drones and model aircraft can be one in the same," he said. "What separates one from the other is mission."

Regardless of the form they take, from free flight wanderers to remotely controlled gliders, airplanes, and rotorcraft (regardless the

number of rotors), they are model aircraft when their pilots fly them strictly for hobby or recreational purposes.

When AMA surveyed its 175,000 members two years ago, approximately 30 percent of them flew drones, according to Rich.

"That percentage is probably higher now, and half of them are EAA members," he said noting that their kinship is a shared passion for flight.

Model aircraft started flying long before manned aircraft, he continued, and since AMA's founding in 1936—guided by its code of safety—there has never been a fatal meeting of the two. FAA Advisory Circular 91-57, Model Aircraft Operating Standards, is a single page born of the AMA code and dated June 9, 1981. Thanks to their safety self-discipline, model aircraft pilots have not attracted undue attention from their peers. That changed with the introduction and rapid growth of drones, primarily camera-equipped multi-rotors.

Most of the newcomers were unaware of aviation safety because they did not get involved through the traditional pathway of a local hobby shop or club. If their technology is properly set up, drones are easy to fly right out of box, according to Rich, who's been eyeball deep in drones since 2008. But as every pilot knows, technology can fail, so pilots must know how it works, and must know how to fly the aircraft manually.

The nationwide network of 2,400 AMA clubs welcomes new members with training at their flying fields. In addition to teaching the safety code and nuances of their local airspace, newcomers learn to fly with—and without—the aircraft's technology in case the aircraft loses its GPS orientation.

"It thinks it is somewhere other than its actual position, so it just takes off," Rich said. "Pilots need to learn how to fly manually so they can safely recover it."

This training is no different than the simulator training full-scale pilots undergo; the instructor fails a system and teaches the new pilot to deal with it.

In January 2014, AMA signed a memorandum of understanding with the FAA to collaborate on safety procedures for model aircraft. Part of the plan was to include AMA safety literature with each small drone sold, Rich said. That collaboration was sidetracked in June 2014 when the FAA published its interpretation of FMARA 2012 Section 336, which exempts model aircraft from drone rulemaking.

To be exempt, pilots must fly their unmanned aircraft in accordance with community-based safety guidelines (the AMA code of safety) strictly for hobby or recreational use. The FAA interpretation defined "hobby" as a "pursuit outside one's regular occupation engaged in especially for relaxation," and "recreation...refreshment of



Left: An alternate camera gimbal allows the attachment of a GoPro camera.

Below: Yuneec Q500 controller. Note altitude readout to stay within limits.





EAA AirVenture Oshkosh 2015 will feature EAA's first-ever drone cage.

SEE IT AT AIRVENTURE

Aviation Gateway Park at EAA AirVenture Oshkosh 2015 will feature EAA's first-ever drone cage. Measuring 80 by 80 by 24 feet, the cage will be located immediately next to the air-conditioned Innovation Center. Aviation Gateway Park, just northwest of the tower, also includes the Education & Career Center and the Forums Center.

With the drone cage, programmed jointly by EAA and the Drone Media Group, we will be introducing many new activities to our members and attendees that provide a glimpse into the burgeoning world of drone flight, and using the activities to stimulate interest in flight for people of all ages. From manufacturer demos and educational sessions, to obstacle course contests and free flight opportunities, there will be something for everyone.

Aviation Gateway Park provides the perfect venue in which to familiarize oneself with innovation in the world of flight, including drones and the pathway to careers in unmanned flight.

strength and spirits after work; a means of refreshment or diversion.”

Unmanned aircraft operations that further or are incidental to the pilot's business “would not be a hobby or recreation flight.” For example, a realtor using

a camera-equipped aircraft over a property he or she is trying to sell is not flying a hobby or recreational flight.

By this interpretation, the FAA considers all UAS operations that are not “hobby or recreation” as commercial ops subject to the forthcoming regulations.

“That's 180 degrees of AMA's position,” Rich said. “Tell us what's commercial, and everything else is in the hobby arena.” Regardless of the point of view, the FAA interpretation made it clear that while model aircraft would be exempt from UAS regulations, their operators, like all pilots, would still be subject to enforcement actions for Part 91 regulations, such as careless or reckless operation (91.3), right of way (91.113), and operating on or near an airport that ensures safety of the national airspace system (91.126).

The disagreements stemming from the competing points of view regarding unmanned aircraft will eventually be resolved as the FAA works through its

regulatory process, just as it has with amateur-built experimental aircraft, Part 103 ultralights, and light-sport aircraft and sport pilot certification. In the process, drone pilots will join the fraternity of aviators and strengthen the voice of aviation as the newcomers before them have.

One thing few, if any, will disagree on is that drones are going to be huge regardless of their ultimate recreational or commercial use. Traditional aircraft modeling has long been a path to the cockpit according to Rich, and he sees drones offering a similar portal to full-scale aircraft.

“The industry is too young to have supporting data, but drones are a gateway to the world of flight,” Mannie said. “It opens the door to anybody who wants to live in it and explore its every opportunity.” *EAA*

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