

A Field Guide to Civilian Drones

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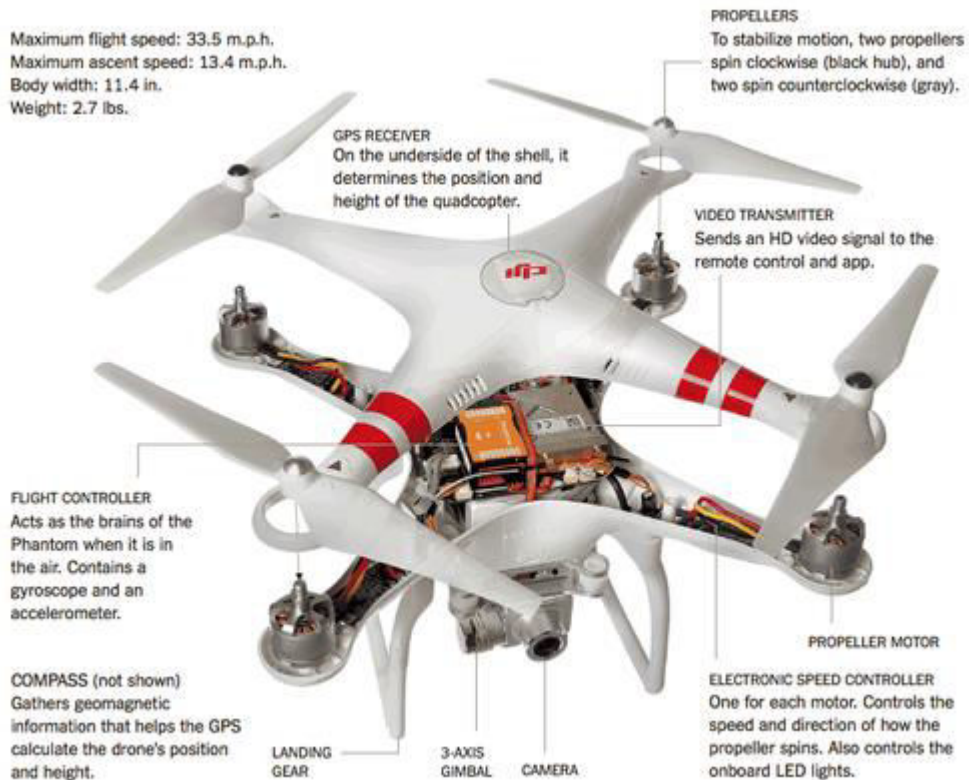
Prepare to see more objects hovering above you. One aviation consulting firm, the Teal Group, estimates that about two million consumer drones, or unmanned aerial vehicles, will be sold worldwide this year alone.

Drones have been [used by the military](#) for several years, but as sales of their civilian cousins rise, so do [safety concerns](#) among regulators and law enforcement agencies, which worry about everything from drone collisions with airplanes to crashes into crowded stadiums.

The government [announced](#) new rules in June that will make it much easier for companies to use drones for commercial purposes, but those rules stop short of allowing for package delivery by drone, which Amazon and Google are both pushing for.

For hobbyists, the Federal Aviation Administration [announced](#) rules in late 2015 that require nearly all owners of remote-controlled recreational drones to register in a national database, an attempt by the agency to address safety fears.

Here is what drones will increasingly be up to in the skies:



A Phantom 2 Vision Plus, made by DJI. It has four propellers and comes with a camera that can record high-resolution images and high-definition video. Credit Frank O'Connell/The New York Times; Photos by Tony Cenicola/The New York Times; Source: DJI Technologies

What Exactly Are Drones?

Drones, also known as unmanned aerial vehicles or unmanned aircraft systems, are more advanced versions of the model airplanes hobbyists have flown for decades. They come in airplane and helicopter varieties, sometimes with eight or more spinning rotors. While drones are typically piloted from the ground by a human with a radio controller, many are also capable of autonomous flight along programmed coordinates.

How Many Drones Are Out There?

It's tough to get a precise estimate of drone sales because most manufacturers are private companies. But one lobbying group, the Consumer Technology Association, says drone unit sales and revenues are expected to double this year. The group expects 2.8 million consumer drones will be sold in the United States in 2016 and revenue will reach \$953 million. Globally, sales of drones are projected to reach 9.4 million units in 2016 and revenue is expected to reach \$3 billion, the group says.

Drone racing is a fast-growing extreme sport in which pilots compete head-to-head with small flying drones while wearing first-person-view goggles. Credit Video by By ERIK OLSEN on Publish Date November 11, 2015

How Can Drones Be Used?

Some hobbyists buy drones for the sheer joy and challenge of flying an object in the sky, but the biggest thrill for many is capturing spectacular high-quality photographs and video from an aerial vantage point.

For those interested in drones for commercial purposes, the government in June [announced](#) rules that make it much easier for companies to use drones for a variety of tasks, including aerial photography and emergency response.

The rules stop short of allowing for package delivery, a goal of Amazon and Google.

The demand by companies for permission to use drones has been broad, including from the real estate industry, news organizations, farmers and emergency responders.

What Risks Do They Pose?

One of the biggest safety concerns about drones is that they could collide with [aircraft](#), endangering [passengers and pilots](#). Drones capturing aerial footage of wildfires have [hindered efforts](#) by helicopter and airplane pilots to put out the blazes. The flying vehicles have crashed near spectators at crowded events like the [United States Open](#) and [a football game](#). There are also concerns about use of drones to [violate privacy](#) and to [smuggle](#) weapons, drugs and other contraband into prisons. Some drone makers like DJI are developing software that will prevent people from piloting their drones into restricted airspace.

How Is the Government Regulating Them?

New rules governing commercial drone use announced by the Federal Aviation Administration in June allow a broad range of businesses to use drones under 55 pounds, but with several restrictions: The drones must be operated by a pilot who has passed a written test and is at least 16 years old. The drones can only be flown below 400 feet, during the day, and at least five miles away from airports.

The rules, which went into effect Aug. 29, stop short of allowing for package delivery, a goal of Amazon and Google, which have pushed the [F.A.A.](#) to create rules that would allow them to transfer much of their ground-based delivery system to the sky. But experts say the government's action brings that vision one step closer to reality.

Under rules [announced](#) in December 2015, nearly all owners of remote-controlled recreational drones are required to register in a national database. Drone owners are [required](#) to submit their names, home addresses and email addresses with the F.A.A., disclosures meant to nudge users to be more responsible, officials said.

States, meanwhile, have been busy passing their own regulations. Twenty states have passed tighter restrictions on consumer drones, banning them in parks, neighborhoods and over churches and schools, for example. The new city and state laws have set up potential clashes with the F.A.A., which has warned local regulators that any new law should go through the agency.