

## TECHNOLOGY

# Invasion of the

These unmanned aircraft may soon be delivering pizza to your doorstep, but drones also raise some serious questions

**T**he residents of Lickdale, Pennsylvania, are used to the sound of aircraft buzzing overhead. With a National Guard base located nearby, aircraft regularly transport troops to and from the base.

Still, the residents were surprised by what happened on the afternoon of April 3 of last year. A curious-looking airplane slammed into the ground next to an elementary school. Fortunately, school was out for the day and no one was hurt.

The aircraft turned out to be a drone, or unmanned aerial vehicle, operated by the U.S. military.

In Lickdale and across the

United States, drone sightings are becoming a lot more common. They're now being used by everyone from farmers and scientists to Hollywood directors and police departments.

Amazon hopes to use drones to deliver packages within 30 minutes of your order. Food may soon be flying too. A pizzeria in Brooklyn, New York, recently did a test delivery of a pizza using a drone. And drones could soon be delivering emergency medical supplies, fighting fires, and protecting endangered animals in Africa from attacks by poachers.

"The uses are limited only by

the imagination," says Colin Guinn of 3D Robotics, a major U.S. drone manufacturer.

But the increasing use of drones also raises some important issues. Here's a look at three major areas of concern.

## Safety

In the past few months, dozens of near-misses have occurred between drones and planes, including several at airports in New York, Los Angeles, and Washington, D.C. There's even a scary new term—"flyaways"—to describe drones that escape their operators' control and crash



The RQ-7B is the type of drone that crashed near a school in Pennsylvania. It is 11 feet long and weighs 375 pounds.

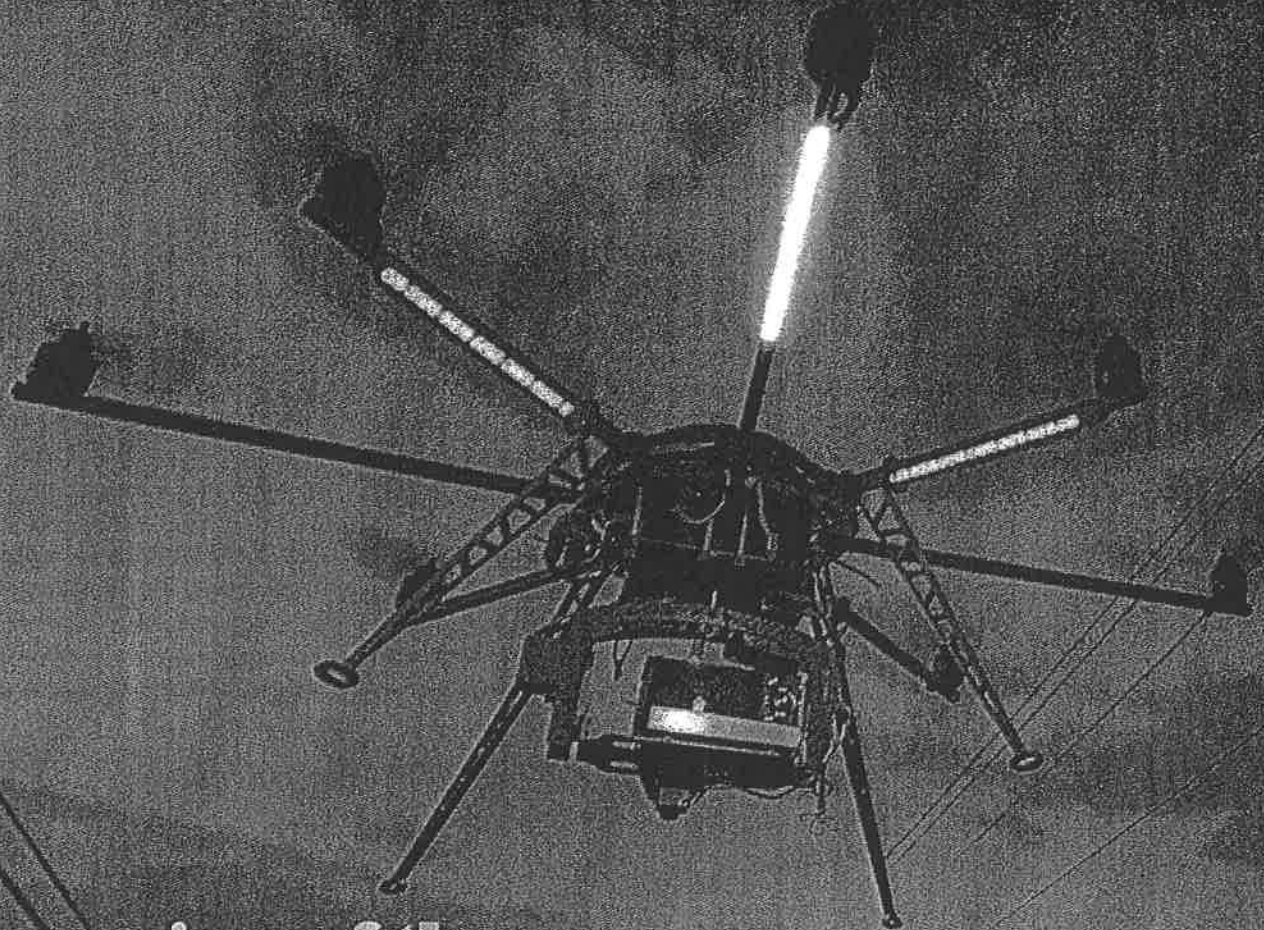
The aircraft is used for scouting out targets, spying, and getting information about battlefields. It can recognize vehicles from 8,000 feet above ground.

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## Invasion of the **DRONES**

They may soon be delivering your pizza, but drones raise serious issues about privacy, safety, and even war. p. 6

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# DRONES

because of software glitches, wind gusts, or operator error. Many flyaways end with the drones smashing into buildings or trees.

Twenty states already regulate drones. New federal rules are expected to require operators to have a license, and to fly drones only during daylight hours, below 400 feet, and within their sight.

"It's kind of like the early days of the automobile, with people speeding and not knowing what they were doing," says Arthur Holland Michel of the Center for the Study of the Drone at Bard College in New York. "Everyone is holding their breath that there won't be a horrendous incident like a drone getting sucked into the engine of a jet."

## Privacy

Legal experts are concerned about the potential for drones to violate people's right to privacy

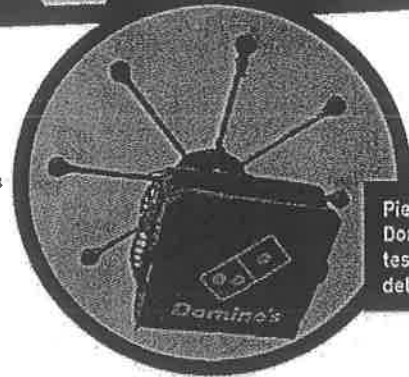
under the Fourth Amendment to the U.S. Constitution. The amendment protects individuals against "unreasonable searches and seizures." That means police must either get a court-issued warrant or have "probable cause" to search people or their property.

But the Framers couldn't have imagined a police drone hovering overhead: Does that constitute an "unreasonable search"?

"We don't want the government hovering over our cities and towns 24/7 and tracking everywhere that everyone goes," says Jay Stanley of the American Civil Liberties Union.

## Warfare

Drones have already transformed modern warfare. Sitting in front of a video screen at a military base in the U.S., drone operators use joysticks to pilot



Pie in the sky! Domino's is testing drone deliveries.

drones over targets thousands of miles away. In 2002, the CIA began employing large armed drones to shoot missiles at suspected terrorists in Afghanistan and Iraq. The U.S. has also used drones to conduct strikes in countries where it has not been at war, including Yemen, Somalia, Libya, and Pakistan.

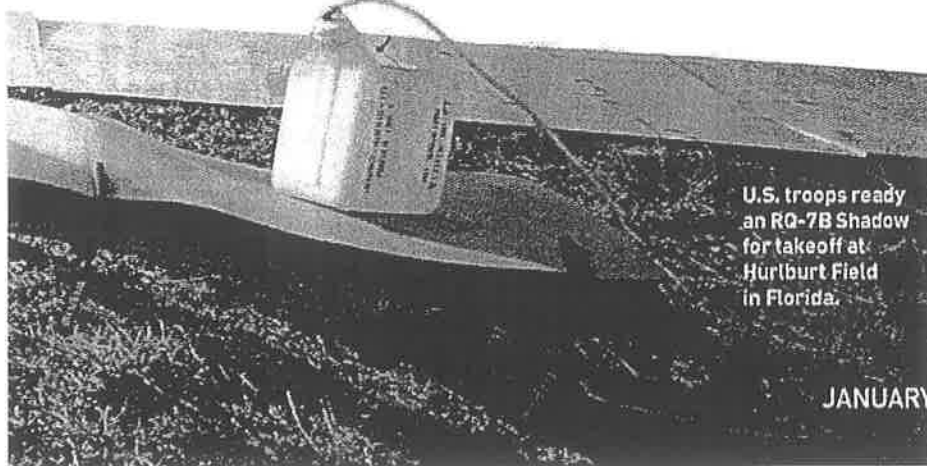
Drones have several advantages over manned aircraft. Drones can stay aloft for several days. They can be equipped with video cameras and listening devices that can closely monitor what's happening on the ground.

Their strikes can also be extremely precise. A drone strike can kill a person in one room of a house and spare the lives of people in other rooms. Their precision means there's less of a chance of innocent civilians being killed. There have, however, been cases of drone attacks killing civilians along with the intended target.

—Hugh Westrup

## Words to Know

- **probable cause** (*n*): a requirement that police have adequate reason for conducting a search
- **civilian** (*n*): a person who does not work for the military, a police force, or the government



U.S. troops ready an RQ-7B Shadow for takeoff at Hurlburt Field in Florida.



What rules should be required for the use of drones?

