

Drone driver licenses? How to make flying robots safe for American skies

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Cameron Rose, of UC Berkeley Biomimetic Millisys Lab, catches a flapping-winged drone resembling a bird at the DARC conference's AfterDARC session in NYU's Skirball Center in New York, N.Y, on Friday, Oct. 11, 2013.

A romantic pre-wedding photo shoot turned sour when the photographer's camera-equipped quadcopter swerved out of control and hit the groom on the head.

"We cleaned up the blood and just kept going," [Davey Orgill](#), the photographer — who had been filming the bride- and groom-to-be on Aug. 1 on a grassy field near La Barge, Wyo. — told NBC News. After the wedding, with the couple's permission, he uploaded the [fateful shot to YouTube](#) where it's been viewed more than 1 million times.

Quadcopter hits groom in the head

In Manhattan, in October, a pedestrian [narrowly missed a collision](#) with a Phantom quadcopter when it landed on the sidewalk as he walked past Grand Central Station. Early in September, in a far more sobering incident, a [19-year-old hobbyist pilot](#) was killed when his remotely operated helicopter hit him on the head during a flight in a park in Brooklyn.

Hobbyist drone pilots will tell you that small drones are notoriously temperamental and accident-prone. Community discussion forums are filled with crash-related queries, and YouTube documents ample evidence of camera-carrying quadcopters or hexacopters getting tangled up in trees and toppling to the ground.

"In the late 1920s, aircrafts were still failing out of the sky left and right," Missy Cummings, who studies drones and autonomous systems at MIT, said at a panel discussion at the Drones and Aerial Robotics Conference (DARC) in New York on Saturday. Today, drone technology is at the same place.

Before company-operated drones are integrated into U.S. airspace in 2015, as the Federal Aviation Administration's Modernization and Reform Act of 2012 mandates, safety regulation is one of hurdles the FAA will need to clear. A panel of experts at DARC agreed that before drones become a daily sighting, technology and humans both need to start behaving just a little bit better.



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Julian Szajdzicki catches an AR Parrot 2.0 drone during a demonstration by Nodecopter at the AfterDARC session.

Small drones like quadcopters can be bought online, and adding warnings to the bots could be an easy first step. "The DJI Phantom doesn't come with a label saying, 'Hey, this could hurt someone,'" Mike Winn, a founder of DroneDeploy, a company that is building autonomous control platforms, said. "It's like buying a model race car." In other words, there's no lengthy list of all the damage it can do.

One way to assure a minimum level of competence could be pre-use certification, a "driver license" of sorts for pilots who fly the birds.

Operators of small military drones like Ravens are trained before they can use them, and Capt. Adam Gorrell — who trained drone pilots and flew them himself in the U.S. Air Force, before becoming a professor at the Air Force Academy — sees a similar training system working for

domestic operators, too. A different, smaller craft perhaps wouldn't need the same amount of training time, but the "mark in the sand" for flight readiness could be shifted accordingly, he said.

The Northeast UAS Airspace Integration Research Alliance (NUAIR), a New York and Massachusetts coalition applying to be a drone test site that will help the FAA form its safety regulations, is considering including pre-flight training for emergency responders at its base in Syracuse, N.Y. This could equip firefighters and police to deploy the crafts safely and quickly, Andrea Bianchi, a representative of the NUAIR said.



Jonathan Sanger / NBC News

Riley Morgan, 14, flies a home-built drone AfterDARC on Oct. 11. Morgan has been working with drones for half a year. This drone took him two days to build and cost around \$1300 in parts.

Classifying the crafts by weight could help regulators come up with an effective safety strategy, several panelists agreed.

Small drones range from a few grams in weight to several pounds. Just as driver licenses are distinguished by vehicle class — trucks or limos or motorbikes or cars — it makes sense to separate the qualifications for drone users, too. The safety risk they pose differs depending on their size, Winn, of DroneDeploy, pointed out. "You can't lump everything together."

Others are less sure that humans, even trained ones, can be trusted at all. Drones would need to come with software-based "training wheels," or "safety bumpers," to protect amateurs and reckless pilots from harming themselves and others, Cummings said.

Just like cars are getting lane departure warnings, proximity sensors and adaptive cruise control, drones will eventually get detect-and-avoid technologies, which will give them the smarts to dodge a bird or another craft in its path. The commercial applications aren't quite ready, but mapping and sensing technologies for small drones is progressing quite briskly in research labs.

"In the end the technology will have to rise to the level of smartness to stop humans from doing stupid things like taking their own heads off," Cummings observed, adding that for as long as we have been printing them, people have been tossing out instruction manuals unread.

What about drone drunk driving?

"I want to show *just* how safely can you control a drone, at what level of blood alcohol," Cummings said. "If I ever get the funding."

Flying a drone? Check out the [safety guidelines suggested by the Academy of Model Aeronautics](#).

Nidhi Subbaraman writes about technology and science. Follow her on [Facebook](#), [Twitter](#) and [Google+](#).