

ENG 'kites': Tethered drones for newsgathering

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• **By Henry H. Perritt, Jr.**

Most of the fascination with civilian drones has focused on those that engage in free flight, orbiting or hovering over news according to commands given by their drone operators (“DROPs”), aided by onboard autonomous navigation systems.

Many in the news business, most notably including CNN and a major satellite news operator, also are interested in another type of drone, one tethered to the ground by a lightweight cable that not only holds it in place but also delivers electricity and collects high-definition video in real time.

CNN, another network, or a television station can launch a tethered drone and keep it in the air for hours to cover breaking news such as a fire, a major vehicle accident, a natural disaster, or a police standoff. Now, coverage of such events requires hovering a news helicopter in the vicinity, interrupted by refueling stops every couple of hours, or launching a free-flying drone which has to land every twenty minutes for battery replacement.

Charles Spoto, the founder and proprietor of Satellite Technology Systems, Inc., one of the largest and most successful providers of satellite truck services to television networks, believes that tethered drones will be an important tool for aerial news coverage. “They will provide the same point of view as cameras mounted on portable masts, but from more desirable heights,” he says. “They’ll

be used primarily for wide shots, although they could be equipped with remotely controllable zoom lenses for closer shots.”

“They are much safer than free-fly drones,” he adds. “All that’s necessary is to ensure the appropriate tether and to clear people out of the radius represented by the length of the tether. That way no one can get hurt even if the drone malfunctions and comes down. There’s no need for elaborate regulation like what the FAA has proposed for free-flying drones.”

Spoto is designing his own tethered drone system to improve on what is available in the market now. “The trick,” he says, “is to send higher voltage along a narrow-gauge copper wire that is part of the tether to reduce the loss associated with high current at lower voltage—these things require a lot of current--and then to use off-the-shelf semiconductors on the drone to step the voltage down and allow the current required for the motors.”

STS has applied for a section 333 exemption and plans to fly its DJI S1000, DJI Inspire, and a tethered drone under the exemption.

CNN got interested in tethered drones when people first started exploring risk mitigation techniques for newsgathering drones. Tethered drones are "inherently safer" than free-fly drones, says Greg Agvent, Senior Director of News Operations at CNN. “Not only does the length of the tether limit the radius in which the drone could land if there is a problem, additional risk mitigation features are possible, such as an emergency backup battery with enough capacity to allow the drone to land if there’s a power loss through the tether, and a GPS-defined tube within the radius of the 199 foot tether so that the area of possible ground contact is even smaller.” The length of the tether is not a significant limitation, says Agvent. “99% of what we need to do with free-fly drones would take place below 200 feet, anyway.”

"Most of the time, we would deploy a tethered drone with a satellite truck. We’ll utilize the tools already in our toolbox." But tethered drones are not going to replace free-fly drones, which provide "intimate aerial pictures that grab attention," as he puts it. “And drones are not going to replace helicopters either; they will all supplement each other.”

Recently, Georgia Tech held a conference involving CNN, local TV stations, local police, fire, and SWAT team representatives. One Atlanta station was enthusiastic about the possibility of keeping a tethered drone in the area over expressway interchanges like Atlanta’s famous "Spaghetti Junction.” “The drone could stay in the air watching the Spaghetti Junction all day for a fraction of the cost of paying \$1000 an hour to keep a helicopter up for three hours during morning and evening rush times. Traffic and weather sell local news," Agvent observes. “This capability is useful not just for TV news; it provides a ‘permanent stare’ that can be streamed. That can be useful to cover any event that unfolds over hours, days, or weeks.”

CNN is actively working with the tethered drone manufacturers, particularly Drone Aviation Corp and CyPhy Works, to explore the capabilities and limitations of tethered drones through its Georgia Tech collaboration and through CNN’s partnership in the FAA’s Pathfinder project.

Dan Erdberg is the chief operating officer of Drone Aviation Corporation. Drone Aviation Corp has

pioneered the field with its \$75,000 WATT 200, \$150,000 WATT 300, and its planned \$25,000 WATT 100. The company has years of experience in delivering tethered drones to the Defense Department.

Erdberg agrees with Agvent that many tethered drones will be integrated with ENG satellite trucks or microwave vans, and that they can cover traffic on expressways in the mornings and evenings for local stations.

Helen Greiner, the CEO of Cyphiworks, first decided to jump into the development of tethered drones because the limited battery capacity of hobby-level drones cannot provide the endurance, what she calls "persistence," needed by news organizations and other users to deal with situations that extend for many hours, days or weeks. A hostage incident is a good example, she says. "A free-fly drone can only stay up for about 20 minutes; the operators have to constantly land and relaunch it to allow for battery swapping. A tethered drone can stay up for 24/7 providing persistent eyes in the sky, while the news organization uses one or more free-fly drones to see over the next hill."

Tethered drones deliver not only persistence, but also the capability of streaming very high definition video in real time, completely secure from misappropriation, jamming, or spoofing, a feature CyPhy Works stresses in promoting its PARC system, capable of carrying 4- to 5-pound payloads.

"The tethered drone is not only a safer, but it can get good coverage by remaining in one place with a 45° standoff angle, thus eliminating the possibility of interference with public safety activities."

Both kinds of drones, Greiner believes, will expand the market for aerial news coverage and thus benefit journalism and, at least in the short term, the market for ENG helicopter services. Until sense-and-avoid is fully developed, a news helicopter is going to be more acceptable to public safety agencies than free-flying drones, because the pilot can see public safety equipment, including police and fire helicopters, and stay out of their way."

CyPhy Works is developing a version of its PARC vehicle that can be launched from a vehicle and follow along behind, capturing imagery as it goes. It already offers the Pocket Flyer, which focuses on the horizontal dimension, to allow news organizations and first responders to fly inside a building, using electricity delivered through the monofilament bundle, while the operator avoids obstacles by using the video fed back from the vehicle.

The crucial challenge, in Erdberg's view, is to get the FAA to "put this at the top of its list. We're all waiting for the FAA to come out with guidelines."

Ironically, the Border Patrol's Aerostats can fly under FAR Part 101 as "moored balloons" or "kites" – with much more relaxed requirements than the FAA is imposing in its section 333 exemptions and proposes in its NPRM. In its 2013 Roadmap, the FAA excluded tethered drones from the category of unmanned aircraft, lumping them with balloons and referring to Part 101. But some people in the FAA now argue that tethered drones do not qualify under Part 101, because they generate lift with motors.

It would be relatively easy to fit them into the national airspace system through the procedures that

already exist for notifying pilots of obstructions like weather balloons, and wind turbines. They can automatically update a NOTAM, Greiner points out, by broadcasting their GPS position.

Furthermore, they may not even be “aircraft” subject to FAA limitations on commercial drone flight. They do not “navigate, or fly in, the air,” under the statutory definition of aircraft. They are more like kites.

Erdberg is optimistic that ongoing conversations with the FAA will pay off in the form a sensible regulatory approach that treats tethered drones as safer, and therefore something less challenging to regulators than free-fly drones.

I hope they do. This is an opportunity for the FAA to simplify a part of its regulatory challenge. Tethered drones could be gathering news tomorrow—safely—but for the regulatory quagmire.

Henry Perritt, Jr. is a law professor and former dean at Chicago-Kent College of Law. He has written and co-written several articles about the potential use of drones in newsgathering, and co-owns a company, Modovolate Aviation, LLC; which was formed to conduct drone research, experimentation, demonstration, and education.

- See more at:

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