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5 **Editor's Note: The Future**
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9 **Flying Cars: Are We Ready for Them?**
Elaine D. Solomon

17 **U.S. AI Regulation Guide: Legislative Overview and Practical Considerations**
Yoon Chae

41 **Artificial Intelligence in Healthcare: Can Regulation Catch Up with Innovation?**
Alaap B. Shah

47 **New York and New Jersey Make an Early Effort to Regulate Artificial Intelligence**
Marc S. Martin, Charlyn L. Ho, and Michael A. Sherling

53 **Artificial Intelligence and the Fair Housing Act: Algorithms Under Attack?**
William T. Gordon, Katherine Kirkpatrick, and Katherine Mueller

57 **Angel Investing Lessons: The First Mover Disadvantage**
Paul A. Jones

63 **The Convertible Debt Valuation Cap: The Trigger Financing Investor Perspective**
Paul A. Jones

69 **Big News for Small Mobility: Germany Opens Up to E-Scooters**
Andreas Grünwald, Christoph Nüßing, and Theresa Oehm

73 **Everything Is Not *Terminator*: AI Issues Raised by the California Consumer Privacy Act**
John Frank Weaver

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Flying Cars: Are We Ready for Them?

Elaine D. Solomon*

Making flying cars a reality is both exciting and visionary. But are the expectations of the entities and individuals who are investing their time, money, and resources into flying cars realistic? This article discusses flying car projects, as well as technology, regulations, integration, and legal and risk management issues. The author concludes that only time will tell if we can strike a balance between technology, public acceptance, and a safe regulatory landscape and air traffic management system to make flying cars a reality.

The Jetsons sparked our imagination with the innovative concept of flying cars more than 50 years ago, but are they now poised to become a reality? Entrepreneurs, start-ups, manufacturers, and transportation companies all over the world are envisioning and moving toward an aviation realm where we will have various types of "vehicles" that can transform into aircraft. In the United States, what is envisioned are sky taxis that will connect with ground transportation systems; infrastructure to support them; and integration into our national airspace. However, somewhat similar to what has transpired with respect to Unmanned Aerial Systems ("UAS" aka "drones"), there are several roadblocks to overcome before this can become reality.

Companies in the Race

Companies getting into the flying car race include Kitty Hawk, a flying car company backed by Larry Page, the co-founder of Google. Kitty Hawk tested a small, one-seat flying vehicle called the Flyer last year at a facility outside of Las Vegas and has also tested an air taxi known as Cora in New Zealand.

Uber has partnered with Embraer, Bell, Karem, Pipistrel Vertical Solutions, and Aurora Flight Sciences (owned by Boeing) for its flying cars. Uber has been announcing at its Uber Elevate conferences over the past few years a plan to have sky taxis operating within the next five years (including building the "sky ports" and

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other infrastructure to support them), with a goal of connecting those air taxis with Uber's ground transportation options or Boeing's supersonic jet network. Pilot cities would include Los Angeles, Dallas, and a third yet-to-be-announced international city. Uber has stated that for the foreseeable future, it will be "conservative" and have its aerial vehicles flown by pilots (using visual flight rules, "VFR") rather than autonomously.

Airbus has gotten into the game with a company called A3, which has already test-flown a vehicle known as a Vehana, apparently hoping to have sky taxis operating within five years. Rolls-Royce plc (the aircraft company, not the engines) has designed an electric vertical takeoff and landing ("eVTOL") taxi that gets electric power from a gas turbine.

Aston Martin has released designs for its futuristic looking Volante Vision. Terrafugia (based in Massachusetts) has built its first hybrid electric aircraft/road vehicle named Transition (to be offered at approximately $400,000). It has folding wings, can fly up to 400 miles at 100 mph, can run on automotive gas, has two seats, and supposedly meets all the applicable Federal Aviation Administration ("FAA") and Federal Motor Vehicle safety standards. However, because of its weight and two-seat capacity, a pilot license is required.

Terrafugia has an FAA exemption (backed by the Aircraft Owners and Pilots Association, "AOPA") to allow it to exceed weight and stall-speed limits so as to allow it to have folding wings and other features that let it transform into a light sport aircraft.

Samson Sky—with former National Aeronautics and Space Administration executive Larry Neu at the helm—recently announced at AirVenture 2019 in Oshkosh, Wisconsin, that it has been gathering reservations for its Switchblade flying sports car, reaching the 1,000 reservations milestone from the United States and other parts of the world.

The Switchblade—designed as a kit-built vehicle, with an estimated starting price of $125,000—has a digital dashboard with a customizable display that changes from flight to driving instrumentation, transitioning the vehicle from driving to flying mode. In addition, the Switchblade has a patent-granted folding wings design that allows the wings to be folded and stored inside the vehicle as it transitions to road use from flight use.

Several international companies have also gotten into the game, including the German company Lilium that is using VTOL

technology to provide an all-electric tilt-rotor design that will carry five people up to 190 miles.

The Chinese company eHang has flown its own drone-like aircraft in Dubai airspace, claiming that their vehicles will fly autonomously—without pilots, but with passengers.

What's the Tech?

Lighter composite materials like carbon fiber, eVTOL, and better battery technology are critical to ensuring that these flying cars become a reality, and that they are practical. The basis for eVTOL technology is electric propulsion—that is, using several small propellers or rotors, each driven by its own electric motor (which is more efficient than one large rotor in terms of thrust)—that can be distributed, and the power applied with more efficiency. As with traditional aircraft, there needs to be multiple layers of redundancy in case of an emergency.

One of the biggest hurdles to overcome is the battery. Most engines that are being tested are electric battery-powered, and others are electric-hybrid, which falls short of the power needed to fly the vehicle any great distance before recharging. The industry will need to develop lighter, smaller batteries and fuel cells that will be safe in flying cars. Other aerial vehicles (such as the Switchblade) will run on high-test or AV gas.

The Regulatory Environment

One troublesome question is what are these flying cars classified as for purposes of the regulatory landscape—some type of motor vehicle that would be within the purview of the U.S. Department of Transportation ("DOT"), or an aircraft that would be within the purview of the FAA? Perhaps it would be a combination of the two, resulting in a regulatory quagmire?

As an example, the Samson Sky Switchblade is classified by the DOT as a motorcycle because of its three-wheeled design. However, it is being built for a pilot and one passenger. Thus, either an auto or motorcycle license will be required (depending on the state), and a pilot license will be required for the person at the controls in the air. Some of these flying cars fall within the FAA's lenient regulations for ultralight vehicles.[1]

In addition, similar to what has occurred with respect to drones, while the technology may be there to make flying cars a reality, stumbling blocks are in the way—notably including the regulatory environment in the United States, the public's questionable willingness or acceptance of risk associated with adding flying cars to our already crowded skies, and our lack of infrastructure to support such a network. The FAA is in charge of regulating aviation safety, and it will have to put in place strict new rules and exercise regulatory oversight before flying cars can become a reality in the United States.

Right now, some flying cars "sneak in" as lightly regulated ultralight aircraft. But once any of these flying cars hit the market, one can expect the FAA to ramp up regulations to address them. By comparison, take a look at what has happened with the federal government and the FAA's goal of integrating UAS into our national airspace. Federal regulations have been slow in coming, and original regulatory timeline deadlines have come and gone.

Air Traffic Management and Integration

In July 2018, the House of Representatives held a hearing that was entitled, "Urban Air Mobility: Are Flying Cars Ready for Take-Off?" Representatives of several companies involved in flying car endeavors were present to tout their capabilities and benefits; however, the FAA was notably absent from the hearing. Noteworthy suggestions included a private air traffic control system to provide air traffic management for flying cars, but the FAA and others have already voiced the opinion that they would prefer to have an integrated air traffic management system rather than separate systems and airspace "lanes."

There seems to be a consensus, however, that there needs to be more test sites and demonstration sites for these aerial vehicles. But there are inherent manpower limitations within the FAA with respect to participation in these projects, including those within the FAA's Integration Pilot Program ("IPP").[2] There is a need to gather data from these projects to move forward with FAA rulemaking, however.

In addition, there is a perceived need to do a better job of sharing data learned from these flying car projects and demonstrations with the industry as a whole, instead of only a sharing of

information between the FAA and participants in these projects and demonstrations.

In short, there needs to be a combined regulatory and industry "test and learn" process to make this happen.

Who Is Winning This Race: Drones or Flying Cars?

There is a thought process that while drones have a head start, there is a tremendous amount of regulatory and industry effort going into flying cars, and the FAA is purportedly not viewing this as drones first, then flying cars. Having attended a few conferences recently where panels have included both FAA and industry representatives, I have heard discussions regarding approvals for and integrating drones into our national airspace versus flying cars. In some respects, the view is that flying cars will actually be easier than drones to move toward reality since they will have pilots (versus being unmanned, like drones), and will be flying at higher altitudes than drones—bringing less challenges with respect to being integrated into our national airspace.

As a result, although drones had a "head start," ultimately flying cars could overtake drones in terms of moving forward.

State Versus Federal Authority

From a regulatory perspective, making flying cars a reality raises jurisdictional issues among federal, state, and local authorities. It is clear that federal, state, and local authorities need to work together, because state and local authorities operate the airports and control where airports and/or other infrastructure for flying cars will be located; where takeoffs and landings can take place; and what hours of operation will be approved. In addition, building and operating critical infrastructure (for example, ports for flying cars) will need state and local involvement. Based upon what I have heard at recent aviation conferences, the FAA is acknowledging that state and local governments need to be involved in this process. And further, state and local governments are clamoring to be used as test sites for demonstrations of flying cars.

Roadblocks

There are several roadblocks that the FAA and other industry principals view as critical with respect to making this a reality. Flying cars will require intense safety analysis—especially for any autonomous flying cars.

The FAA's regulatory scheme over the years has been based on having a human pilot at the controls—whether it is drones or flying cars, not having a human pilot is unnerving on many levels. And just as with drones, there will be the inevitable clash between the federal government/FAA and states over the regulation of flying cars and related infrastructure.

Our transportation infrastructure is already in need of upgrading and updating. Who is going to fund the massive infrastructure required to support and manage flying cars? Will there really be a demand for this type of technology by customers/passengers? Who will be willing to pay half a million dollars or so for a flying car? Will this type of air transportation be viewed by individuals and our government as an unreasonable risk?

Furthermore, manufacturers, operators, and regulators will need to address noise levels, emissions, and public acceptance of flying cars. With respect to noise, one will need to consider, for example, how often flying cars are flown in a particular area, where they are being flown, and the characteristics of sound (for example, the varying noise levels of different types of propellers). The public may be willing, however, to accept certain intrusions or inconveniences in exchange for the utility and benefits of flying cars.

Lastly, the FAA and others will need to demonstrate that they can provide a safe air traffic management system that will integrate flying cars into our national airspace. The FAA's preference is for an integrated air traffic management system, rather than separate designated "sky lanes" in which these types of cars/aircraft can fly. This means that there will need to be digital infrastructure investment for this air traffic management system, and a combined state and federal regulatory process to "test and learn" flying vehicle operations. The participants will also need to look at population density in their proposed areas of operation, look at where the airports are in that area, and prove that they can maintain a level of safety so as to reach a certain level of public and regulatory acceptance.

Legal and Risk Management Issues

Who will be liable for damages caused by accidents or malfunctions involving these flying cars? Will the case law for motor vehicles or aircraft take precedent, and in which situations?

In considering legal issues regarding flying cars, there is often mention of the *United States v. Causby*[3] case, which established the principle that a landowner owns certain airspace above his or her property.[4] That is a concept that will need to be addressed before we put in place "air corridors" for UAS or flying cars to fly in. While addressing circumstances in which aircraft operations would be considered a taking of property, the *Causby* decision did not address whether the FAA's authority to regulate airspace is limited to a specific altitude. It remains to be seen if the limits of "navigable airspace" will shift and be defined by the courts with respect to flying vehicle operations.

Trespass and nuisance claims are also possible causes of action with respect to flying cars. A trespass is any physical intrusion upon property owned by another, or causing a thing to do so.[5] When considering these issues in the context of intrusions into airspace, the courts have used the factors set forth in *Causby* for takings actions: a plaintiff must prove that the interference occurred within the immediate reaches of the land or airspace that the owner can possess; that the intrusion interfered with actual use of the land; and that it detracts from the plaintiff's use of the property.

Nuisance is based on a property owner's right to use and enjoy the land (not possessory rights to the property). A nuisance plaintiff must show that the object in airspace interfered with the use and enjoyment of his or her land, and that the interference was substantial and unreasonable.

Similar to drones, depending on where they are flying, flying cars could very well implicate privacy concerns and associated tort causes of action, including public disclosure of private facts, publicity that puts the target in a false light, or appropriation of one's likeness.[6]

Moreover, given the fact that there has been public outcry over the fact that there have been serious injuries and even death from accidents involving self-driving cars on our highways, there is also the question of what effect the general public's concern for safety with respect to flying cars will have regarding innovation. And will insurance companies want to insure this type of risk?

Conclusion

Making flying cars a reality is both exciting and visionary. But are the expectations of the entities and individuals who are investing their time, money, and resources into flying cars realistic? Only time will tell if we can strike a balance between technology, public acceptance, and a safe regulatory landscape and air traffic management system to make this a reality.

Notes

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1. Federal Aviation Regulation 14 CFR Part 103 defines an ultralight vehicle as one that has only one seat; is used only for recreational or sport flying; and is not required to meet airworthiness certification standards for aircraft or have a certificate of airworthiness. Further, operators are not required to meet aeronautical knowledge, age, or experience requirements, or have an airman or medical certifications, nor are they required to be registered or have registration markings. If unpowered, they must weigh less than 155 pounds; if powered, they must weigh less than 254 pounds (excluding safety devices). They must also have a maximum fuel capacity of five U.S. gallons; a top speed of 55 knots (102 km/h; 63 mph) airspeed at full power in level flight; and have a power-off stall speed of 24 knots (45 km/h; 28 mph) calibrated airspeed or less.

2. The FAA's UAS Integration Pilot Program brings together state, local, and tribal governments together with private sector entities, such as drone operators and manufacturers to accelerate safe drone integration into our national airspace. *See* https://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=23574.

3. 328 U.S. 256 (1946).

4. *See also Restatement (Second) of Torts*, § 159(2) (1977) (A property owner owns only as much air space above his property as he can practicably use).

5. *See Restatement (Second) Torts*, § 158 (1977).

6. *See Restatement (Second) of Torts*, § 652.