



Watch the Skies

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While drone technology has revolutionized military action, its potential civilian uses are expanding rapidly. Newton Investment global analysts consider the growing use and potential future applications of commercial drones.

Until recently, drones or unmanned aerial vehicles (UAVs) were most commonly recognized for their military application and, in small scale, as children's toys. Now, via new technologies, they are increasingly being developed to work in areas such as home delivery, farming, industrial inspection, mapping, search and rescue and even medicine.

Commercial drones are fast becoming big business. According to global research and advisory company Gartner, worldwide market revenue tied to their production and use is expected to grow to over \$11.2 billion by 2020 with almost three million drones produced in 2017 alone.¹ The number of drones sold is also expected to reach 5.5 million in the U.S. by 2020, presenting significant opportunities for investors in the sector.²

A wide range of industries and markets provides rich potential uses for drones. While much recent attention has focused on the development of cargo-carrying drones and their potential use in mail order deliveries by companies such as Amazon, commercial drones are perhaps most commonly associated with mobile photography.

With precision cameras on board, drones can provide useful support in the measurement of mining stocks and mapping and construction, where topographical measurement is required to assess the suitability of sites for new railways, roads and other installations.³

CROP ASSISTANCE

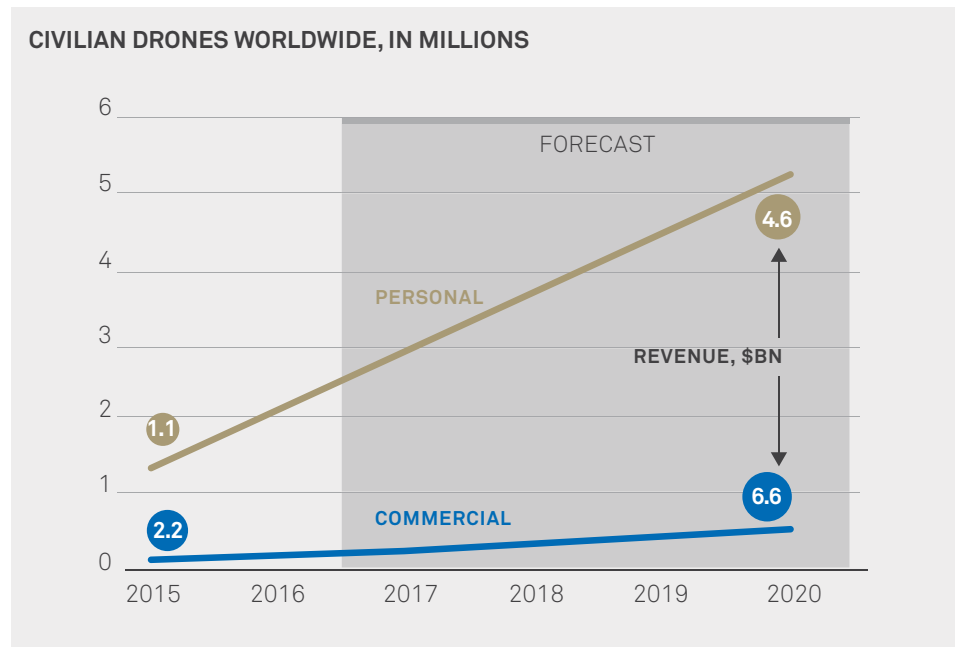
Agriculture has also been identified as a particularly promising area for drone technology. According to global consulting firm PwC, drones can be used for planting, crop spraying and monitoring, irrigation and agricultural health assessment.⁴

Looking ahead, PwC envisages a world of advanced agricultural production, where fleets or swarms of autonomous drones could handle agricultural tasks collectively.⁵ While miniaturization of drones remains problematic, insect-like drones are already being developed and one day may be used to pollinate flowers.⁶

Commenting on potential applications in this sector, Newton global research analyst Robert Canepa-Anson is skeptical drones could ever fully replace heavy-duty agricultural equipment such as tractors. However, he does believe they have a useful role to play.

“Monitoring crops is the key, with plant health being much easier to assess with an infrared camera from the air. It can detect issues long before areas of the field visibly lose their normal healthy color. Farming already uses a lot of technology. Soil testing can map out where fields need more fertilizer, which can be tallied up to combine harvester yield monitors that measure and record crop yield to the nearest square foot using GPS as harvesting is done.

“Spraying equipment and seed drills can also be programmed to alter their volumes of applications and the number of seeds that are planted as they are run across fields. That means accurate aerial data from drones can be meaningfully exploited,” he says.



Sources: Gartner; CB Insights; “Taking Flight,” *The Economist*, as of June 7, 2017. Charts are provided for illustrative purposes and are not indicative of the past or future performance of any Dreyfus product.

DELIVERIES

In the retail sector, much attention has centered on the potential for aerial delivery of consumer goods via drone, but their use extends well beyond shopping to areas such as medicine and health care. A number of health care-related projects are already underway. In Switzerland, the national mail service is piloting a project with California-based logistics and delivery specialist Matternet to fly samples to and from external labs and hospitals via a fleet of drones.⁷

In late 2016 in Sweden, medical researchers from the Karolinska Institute attached a defibrillator to a drone stationed at a fire station near Stockholm. In many cases, the drone took less time to reach the scene than local ambulances.⁸

Within medical applications, Newton global health care analyst Emily Heaven believes drones are unlikely to revolutionize health care but they can and will play a role in medical support.

“The value of drones within medical support appears to be more about transportation than about advances in health care per se. Getting drugs to remote areas, for example,

has been something people have been working on for some time. Drones would certainly help, but of course, health care still requires visits to the doctor for the prescription. In the future, drones will help on the margin, though we don't see them as a major driver for improving health care," she says.

THE OUTER LIMITS

While many have welcomed and been excited by the potential application of drone technology, civil aviation authorities, wider policymakers and governments have been more cautious. Concerns over drone use range from public safety to privacy and health- and safety-related incidents involving drones are monitored increasingly carefully.

Drones may seem to offer robust technology, power and resilience but nature can still produce a range of factors, which can test them to the limit. Extreme weather, the potential for bird strikes and sudden malfunction could, in theory, turn harmless airborne craft into potentially lethal projectiles.

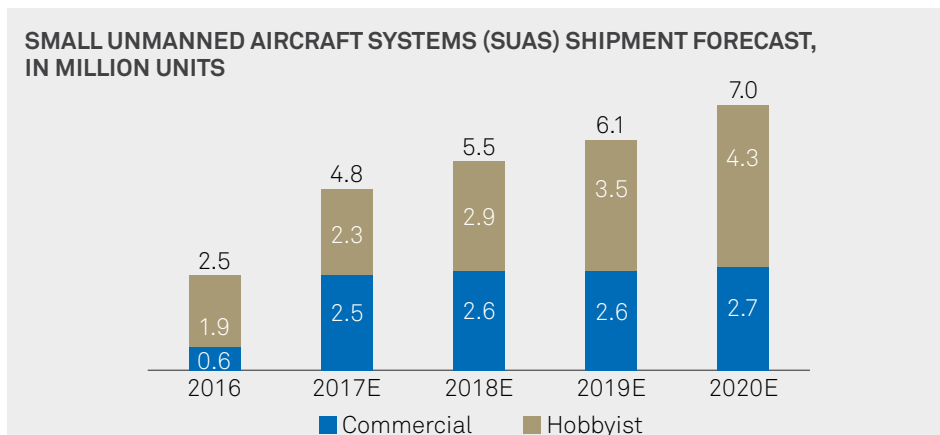
In October 2017, a drone flying at an estimated altitude of 1,500 feet crashed into a small passenger plane in Canada.⁹ While no one was hurt, the incident nevertheless raised concerns about the legislation surrounding drone use in Canada and beyond.

The UK government recently announced sweeping changes to drone legislation, including plans to make it mandatory for people owning aircraft weighing over 8 ounces to have them registered.¹⁰ In an innovative step, NATS—formerly the UK National Air Traffic Services—has launched an app, Drone Assist, to help drone pilots fly responsibly.

In the U.S., NASA's Ames Research Center is developing an Unmanned Aerial Systems Traffic Management (UTM) for drones but early research indicates the implementation of reliable aerial traffic management systems could be some years away.

So far, regulation of the industry has been patchy with different adoption and rules across geographies. However, if drone technology were to become more established, some analysts say a new wave of drone- (and people-) friendly air traffic control systems might be required.¹¹

Either way, the increasing sophistication and application of drones presents exciting potential to both businesses and tech-savvy investors. In turn, a growing number of CEOs and investment professionals are now assessing the potentially disruptive and transformational capacity of this technology in a developing market where the sky really may prove to be the limit.



Source: Federal Aviation Administration/FGRT 17 Retail Trends for 2017. As of January 17, 2017.

MAY THE FORCE BE WITH YOU: POLICE DRONES IN SCOTLAND

In December 2017, the Scottish national police force, Police Scotland, announced plans to test two drones for use in local search-and-rescue and other operations.¹²

The drones, based at Inverness and Aberdeen, hold the potential to help track down missing walkers in often exposed and isolated yet popular walking areas of the Scottish Highlands. It is thought the drones could also be used in local road policing.

Controversially, Police Scotland has not ruled out using drones for wider covert surveillance operations, where lives are thought to be at risk.¹³ The force is reportedly working on a separate project with Glasgow University's Aerospace Sciences Research Division and the University of the West of Scotland¹⁴ to develop UAVs with high-tech intelligent sensors that can effectively "see" in the dark.

In a move underlining the ethical concerns surrounding the use of new technologies such as drones in both the public and private sectors, the UK-based civil liberties organization, Open Rights Group¹⁵ has called for detailed public debate on their use by police before the technology is fully implemented by officers in Scotland.

¹Gartner. Press release – Gartner Says Almost 3 Million Personal and Commercial Drones Will Be Shipped in 2017. February 9, 2017.

²Forbes. Seven Key Facts You Need to Know Before Investing in Drone Technology. March 24, 2017.

³The Economist. Seeing Is Believing. June 10, 2017.

⁴PwC. Six Ways Drones Are Revolutionizing Agriculture. July 20, 2016.

⁵Ibid.

⁶New Scientist. Robotic Bee Could Help Pollinate Crops as Real Bees Decline. February 9, 2017.

⁷Time. Switzerland's New Medical Drones. September 28, 2017.

⁸New Scientist. Defibrillator Drones Could Save Lives Before Ambulance Arrives. June 13, 2017.

⁹The New York Times. After Drone Hits Plane in Canada, New Fears About Air Safety. October 17, 2017.

¹⁰Express. UK Drone Laws: What Are the New Rules on Drone Registration? July 22, 2017.

¹¹The Economist. Regulation: Rules and Tools. June 10, 2017.

¹²BBC. Police Scotland to Trial Use of Drones. December 19, 2017.

¹³The Scotsman. Scottish Police 'Could Use Drones for Covert Surveillance.' December 19, 2017.

¹⁴The Herald. Police Scotland to Use Drones That See in Dark for Spy Missions. December 20, 2017.

¹⁵Ibid.

Risks

All investments involve risk, including loss of principal. Certain investments involve greater or unique risks that should be considered along with the objectives, fees, and expenses before investing.

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