



Photo courtesy of Project Wing/Alphabet

Drone Delivery Update: Moving Forward in the Skies

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DRONE DELIVERY UPDATE: MOVING FORWARD IN THE SKIES

Companies aiming to speed up their supply chain efficiency looking at drones to deliver goods

By Ed O'Brien

Today's industrial and supply chain management organizations are in the midst of a challenging – yet exciting – economic environment. They are wrestling with new and expanded market and competitive forces present in the U.S. and, for the first time in years, many other global economies.

Because of these mostly robust economic conditions, many companies are seeking new ways to be more efficient in the way they operate, how they serve customers, and sometimes their customers' customers. In addition to making production and assembly lines more productive, many industrial firms are fine-tuning their supply chains and distribution channels to be more efficient.

Many progressive firms are looking at alternate methods to deliver select goods to partners and customers. Recent high-profile announcements around the planning and testing of Unmanned Aerial Vehicles (aka drones) as a delivery system has brought urgency to many companies. While most current delivery drones are designed to carry small payloads, some UAVs are being designed to carry loads that can exceed 500 pounds, with their sights on loads of 1,000 pounds or more.

In this report, we'll look at recent developments in research, testing, and regulations. Where might drone deliveries be most likely, what will be delivered, and what companies and drones will be involved?

MARKET SIZE AND GROWTH PROSPECTS

The estimated market size for drones varies greatly, depending on combinations of market segments and sub-segments. For example, Goldman Sachs [estimates a \\$100 billion market opportunity for drones by 2020](#), with much of the growth driven by commercial and civil government markets. Growth within the [transport and delivery space](#) is expected to be \$13 billion. The commercial drone market is [expected to skyrocket to \\$23 billion](#) annually by 2022, up from \$6 billion in 2017. The market for UAVs is expected to [grow from \\$18 billion in 2017 to just under \\$49 billion by 2023](#), a compound annual growth rate (CAGR) of 18.3% during the forecast period. [More than 800,000 commercial drones](#), sometimes called enterprise drones, are expected to ship

in 2021, a CAGR of 51%.

Factors driving the growth of UAV drones include a strong demand for faster delivery times for goods in consumer and business markets, innovations in software and drone design, and new and expanded R&D and commercial funding.

BUSINESS PROBLEMS SOLVED BY DELIVERY DRONES

Companies today are searching for ways to serve their customers better and differentiate themselves. Central to this quest is a desire to move goods efficiently, particularly during the “last mile” of their journey.

[Amazon](#), [DHL](#), and [UPS](#) have experimented with drone deliveries of parcels. For example, Amazon [announced plans to offer multi-rotor miniature UAVs to deliver small packages](#) (under five pounds) to customers within 30 minutes, if they are located within 10 miles of a participating Amazon fulfillment center. But these companies also face technological, legal, and regional challenges.

Companies continue to experiment with delivery drone design and performance, as well as working with regulators to gain approval for use of delivery drones. One example is [the release of the Part 107 rule](#) by the Federal Aviation Administration (FAA) in the U.S., which allowed new exemptions for operation in the U.S. and other countries, opening up opportunities in the transport/delivery, insurance, construction, and agriculture industries.

Current U.S. regulations require that drones fly no higher than 400 feet, no faster than 100 mph, and remain within the pilot’s line of sight. Amazon said it intends to operate between 200 and 500 feet. Amazon also said it plans to fly drones weighing up to 55 pounds within a 10-mile radius of its warehouses at speeds [up to 50 mph with packages weighing up to 5 pounds](#).

[Regulatory issues continue to be sorted out](#) by the U.S. and other countries. At the same time, [near misses with aircraft and helicopters](#) are creating growing concerns about the safe use of drones by inexperienced pilots and the proliferation of drones of all types, both recreational and commercial.

MORE COMPANIES EXPERIMENT WITH DRONES, DESIGNS

Examples of drone initiatives come from companies, ranging from smaller, progressive startups and tech firms to industry behemoths in technology, retail, supply chain management, and aviation. In addition to Amazon, DHL and UPS, Alphabet/Google, Boeing, CyPhy Works, Flirtey, and Flytrex have launched

drone initiatives.

Drones come in many shapes and sizes. A quadcopter, which is relatively inexpensive, can carry lightweight loads. A hexacopter offers more stability and greater carrying capacity than a quadcopter, and an octocopter, the most powerful of the three, can fly to great heights while carrying heavy payloads. Most higher-capacity delivery drones choose the octocopter variant.

Boeing's version of a delivery drone is at the other end of the service spectrum. Boeing's vision is [more like a small helicopter, hauling larger loads](#). Their prototype measures 15 feet by 18 feet, equipped with custom batteries that power eight counter-rotating engines. The six-foot blades let it fly a few hundred feet high, with a theoretical top speed of 70 mph, and carrying up to 500 pounds of cargo ([See video here](#)). Expectations for large drones is that they will make deliveries to manufacturers, distributors, oil rigs, and other industrial companies.



Credit: Flytrex

EXAMPLES OF DELIVERY DRONES IN THE FIELD

Flytrex

Flytrex said it is building the world's first autonomous on-demand delivery network, currently focusing on aerial vehicles. The company sees drones as a viable solution to meet customer delivery expectations. In August 2017, the company partnered with Iceland's largest e-commerce company, AHA, launching the world's first autonomous delivery route in Reykjavik, Iceland. Flytrex said its solution is the first drone delivery system deployed in an urban environment.

Because the terrain around Reykjavik makes it difficult to reach all parts of the city, drone deliveries can make sense for many customers. Using Flytrex's

drone delivery system, AHA can deliver goods between two parts of the city separated by a wide river, dramatically cutting delivery times and costs. Flytrex's system operates alongside AHA's existing vehicle-based delivery network.

Credit: 12019 via Pixabay



The difficult terrain around Reykjavik, Iceland, makes it appealing for testing drone delivery.

“The increase in online shopping has boosted the development of new on-demand delivery services, all powered by a fleet of drivers,” said Amit Regev, vice president of product and co-founder of Flytrex. “Due to their time-critical nature, on-demand deliveries can’t be optimized like next-day deliveries, making them very expensive both for couriers and consumers.”

With the new route, AHA reduces delivery time from 25 minutes by car to as little as four minutes by drone. In some cases, urban deliveries can cost as little as 80 cents per mile. The company can increase its delivery capacity for goods such as food, flowers, or a new phone without increasing manpower. Because the drones are 100% electric, it is an environmentally friendly solution, AHA said.

Flytrex is also working closely with AHA and ICETRA (Iceland’s Civil Aviation Authority) to expand the system.



FLIRTEY

Flirtey, a small, Nevada-based drone startup, is the [first U.S. company to get government approval to make deliveries by drone](#), beating out Amazon and Alphabet/Google. “There’s nothing quite like a flying robot delivering a package into your hands within minutes of placing an order,” said Matthew Sweeny, Flirtey’s co-founder and CEO. “That is a magical experience.”

Flirtey partnered with Domino’s Pizza in New Zealand for food delivery, and with convenience store chain 7-Eleven in the U.S. to experiment with over-the-counter medications and other product deliveries. Drone deliveries are made in protected, insulated boxes, so a wide variety of goods can be delivered to customers. Sweeny said a customer could use their smartphone to order the medicine. Flirtey would load the package, and a drone would take off vertically, flying via predetermined GPS coordinates to the customer’s home or smartphone location. “When the customer is ready to receive the delivery, the drone hovers at about 50 feet (which is generally above houses, trees, and power lines), and slowly lowers the goods via a tethered line and custom packaging to ensure that cold goods stay cold, warm goods stay warm, and delicate goods stay unbroken. We then fly back and land autonomously where we took off from, reload that drone and conduct that delivery again.” [Watch a video here.](#)

PROJECT WING

Alphabet/Google’s X Development Company’s Project Wing aircraft can fly preplanned routes on demand using sensors and software to detect and

avoid each other in real time. The company developed an architecture with redundant motors, batteries, and navigation systems with intelligent controls, so backup systems help keep aircraft safe in flight.

Last fall, the company started testing [drone deliveries to residential yards in rural Australia](#). The testers, including young families, busy professionals and retirees, said this technology could eliminate the inconvenience of having to drive 40 minutes roundtrip in the car for almost anything, whether it's a carton of milk, vegetables, or a cup of coffee. [Watch a video here](#).

CONCLUSIONS AND RECOMMENDATIONS

New technologies and processes continue to dramatically change the world of supply chain management, transportation, and distribution. Nowhere is this more evident than in the “last mile” of a journey.

Customers continue to demand better, faster and cheaper ways to receive goods, expecting shorter online and e-commerce delivery times and more stringent terms of service.

Currently, delivery drone development faces high R&D, fixed and labor costs. The market is shifting from alpha tests and regulatory analyses and assessments, and proofs-of-concept to beta tests and early production systems. The earliest use cases are justified within high-value areas, such as pharmaceutical and healthcare delivery. As the industry moves forward, costs will decrease for everyday delivery as demand increases.

Consequently, even though delivery drones are a nascent technology today, they are an emerging force to be reckoned with as manufacturers, distributors, and delivery firms look for ways to be more customer-centric and laser-focused on their needs.