

## Struthers Report V25 # 4.3 Amazon Prime Air, Drone Delivery FLT, Google Apr., 1, 2019



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### Amazon Prime Air Stuck In The Hanger While Competitors Are Flying Deliveries.

- Amazon Prime Air is mostly hot air.
- Working with regulators is the key to progress.
- Google and Drone Delivery Canada are leading the charge.
- Early movers will own the flight paths.

I believe there are three important elements that have contributed to Amazon's great success:

- Choice with a wide selection of goods;
- Price that is very competitive with online or bricks and mortar stores;
- Delivery that is consistent and quite fast.

[Kantar Consulting's 2018 report](#) ranked Amazon at number 3 in sales among the top retailers, behind Walmart and Kroger, based on 2017 numbers. The Top 100 Retailers has changed very little over the past several years. This year, Amazon is ranked No. 3, while last year Amazon was No. 7 and the nine other retailers in the Top 10 remained the same. Five years ago, Amazon was in 11th place and eight of the Top 10 retailers were the same as this year: Walmart, Kroger, Target, Costco, The Home Depot, Walgreens, CVS and Lowe's. In 2008, that same solid eight held the top of the chart while Amazon was ranked at No. 25. Amazon is not far behind Kroger and just might over take them when 2018 numbers are final.

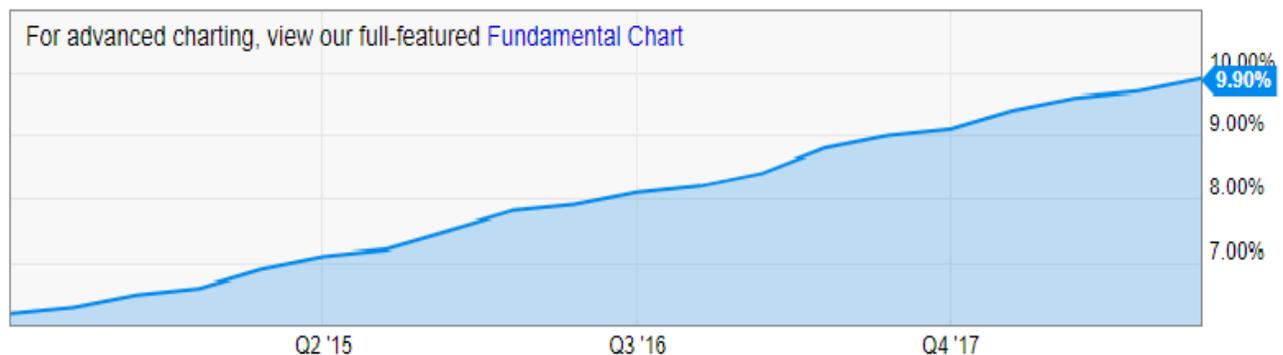
Amazon has been climbing steadily and that is more impressive when you consider that only 9.1% of US retail sales were online as of December 31, 2017, shown from ycharts.com below. Amazon has been taking advantage of this trend and is no doubt a leader in e-Commerce sales.

US E-Commerce Sales as Percent of Retail Sales Chart

[View Full Chart](#)

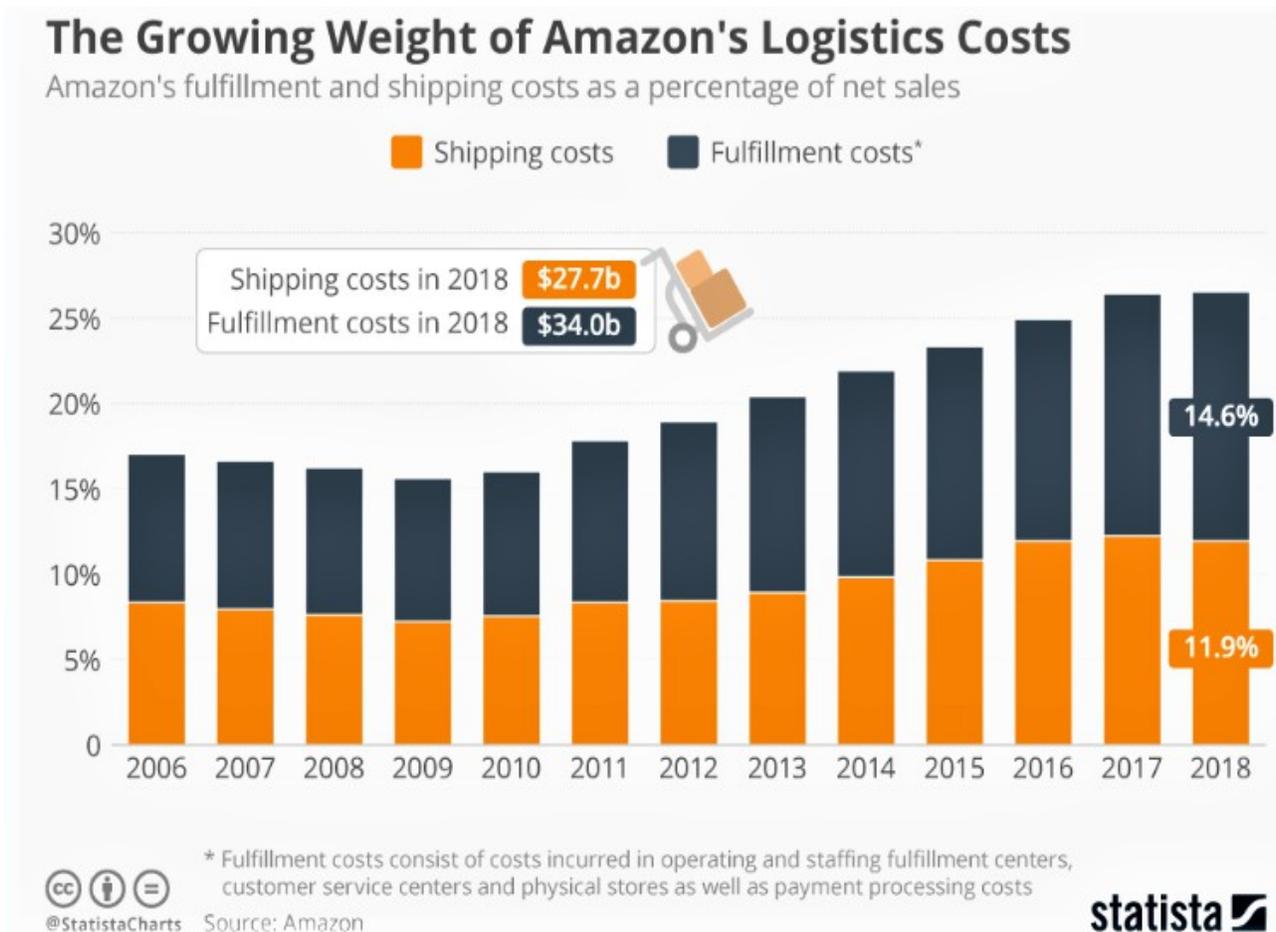
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There is a new disruption on the way that will level off this graph in the next few years. We have come from 'bricks and mortar' to 'online shopping' and the next wave of change, I have dubbed 'mobile shopping'. Thanks to the higher power of smart phones, better and higher speed networks, a shoppers mobile device will allow them to experience both the online as well as bricks and mortar at the same time. Shoppers will no longer have to sit in front of the computer screen at home to shop online. New companies, that nobody has heard of will lead this charge, private companies like [Heelo](#). They have started to deploy their proximity marketing solutions and will likely be a top contender in this new category.

That aside, currently Amazon is a leader in e-Commerce sales. However they are struggling to keep their delivery costs under control. It is obvious from the chart below from statista that Amazon's shipping and fulfillment costs have been rising steadily from around 17% of net sales to over 25%.



These rising costs are a real challenge. Amazon is making progress with warehouse automation and gaining more control over their delivery process, but their approach with delivery drones has a serious flaw from the onset.

On December 21, 2018 the [Chicago Tribune reported](#) that Amazon will lease 10 Boeing 767s planes, bringing its total fleet to 50 with the goal of getting orders to people faster and more reliably. Amazon's fleet of planes is far smaller than those at UPS and FedEx, which number in the hundreds, but it's pushed in recent years to close that gap will gain them more control over deliveries.

Amazon [acquired Kiva Systems for \\$775 million back in 2012](#) and since then has been steadily investing in a robotic future. [According to a September 2018 interview](#) with Brad Porter, VP robotics at Amazon, there has been great progress. *“Today we have more than 100,000 drive units deployed throughout our global fulfillment network. But many forget those aren’t the only robots we have. We have deployed around 30 palletizer systems, and another popular robot you might see in our fulfillment centers is called RoboStow—a 6-ton robot that has the ability to move pallets of products up to 24-feet high and directly onto the larger drive units.”*

One can find some good results with robotics and inventory management at Amazon, but when it comes to Amazon Prime Air, it is just talk and little results. [Amazon Prime Air](#) is a conceptual drone-based delivery system that Amazon announced in 2013.

From [Amazon's web site](#). *“We're excited about Prime Air — a delivery system from Amazon designed to safely get packages to customers in 30 minutes or less using unmanned aerial vehicles, also called drones. Prime Air has great potential to enhance the services we already provide to millions of customers by providing rapid parcel delivery that will also increase the overall safety and efficiency of the transportation system.”*



[As of January 2019](#), Amazon's latest update is that they are working on a flight management system *“We will always prioritize safety first within our system,”* said Roth. *“People both on the ground and in the air are the most important to protect. We’re building a traffic management system with this as our guiding principle.”*

I call Amazon Prime Air, hot air because I believe they took the wrong approach. Flying drones are not just another technology that you can develop how you see fit to meet your plans or dreams. This is what Amazon has done, announcing how they want to use drones, but forgot the most important aspect. Flying delivery drones falls under the mandate of controlled airspace run by the [FAA](#). This is the most heavily regulated industry on the planet as it can take years just to get in flight eating utensils approved.

Amazon's drones will have many more challenges as well. Drones have to make a controlled landing in a nicely spacious area, city-dwellers and those of you in blocks of flats are going to have some issues. Then there are obstacles such as telephone wires, people, birds and narrow streets. The lack of a private landing area is another issue. By the time you get down to the communal courtyard, chances are a drone-tracking

crook will have commandeered your abandoned package. Drones have a performance-restricting flaw called battery life, which is a potential problem for the airborne devices. Amazon's [debut drone features a 15 mile range](#). That's 7.5 miles there and the same back, so if you are not close to a distribution center, forget it. There is weight restrictions too, on what the drone can carry and that is 5 pounds with Amazon's current drone.

**Drone deliveries could really help cut Amazon's costs but don't expect any airborne deliveries from Amazon in the next few years.** This is re-enforced from the video on their web site as they are just delivering to a couple rural customers in the U.K. at this time.

While Amazon Prime Air is a long ways off from flying, Google and a small Canadian company are far more advanced and could be a great blue print for Amazon. Perhaps much easier for Amazon just to buy the small Canadian company and integrate a lot of that into what they are working on.

### **Drone Delivery Canada (TAKOF), Market Cap US\$147 million**

Not to confuse their name with the drones, I will call the company TAKOF.

TAKOF took a very different approach. Their first target was more remote communities where there are less obstacles to over come and there other approach is depot to depot deliveries. This made for simpler logistics so they could advance all aspects of their platform more quickly and cost effective. In Canada, First Nations remote communities have a need for drone delivery services, it is not just a nice convenience. This also opens up government funding assistance to the benefit of these communities and TAKOF.

While Amazon is still working on a Flight Management System. TAKOF already has a working flight system (FLYTE) that encompass numerous levels of security, redundancy and resiliency. Utilizing industry leading software, customization, and patent pending architecture, TAKOF has a group of applications that come together under an umbrella to provide a complete solution for the delivery industry. The flight systems cover all aspects of a UAV from the operational component, but also the logistics integration. The operational platform includes full operational guidance, route planning, geo-fencing, alerts, telemetry, maintenance, logs, full preventative maintenance scheduling and tracking. I seen a demo of this system at the company's office last year and it was quite impressive. It also tracks other aircraft with feeds from the relevant [Flight Information Region](#).

TAKOF is integrating next generation Super Materials into their drone designs which include; Graphene and Carbon Fiber. Their prototyping and design platform also utilizes 3D Printing systems to expedite concept design that are patent pending. TAKOF does not plan to be a drone manufacturer but will vend out manufacturing of their approved drone models as commercial demand increases.

#### **TAKOF now has a fleet of four different capacity drones called:**

- The Sparrow X1000, payload 5 kg, travel range 30 kilometers;
- The Robin X1400, payload 12 kg, travel range 60 kilometers, tethered delivery;
- The Falcon, payload 22.5 kg, travel range of 60 kilometers ;
- The Condor, payload 180 kg, travel distance of 200 kilometers.

The Sparrow X1000 was the first drone that TAKOF developed and was used for all their tests and certifications. It was the first cargo delivery drone of its kind to be accepted under the Transport Canada, Compliant UAS program [in December 2017](#).

[In June 2017](#), TAKOF was the first drone delivery company to achieve BVLOS flights under Transport Canada's oversight. The systems that were tested predominantly include DDC's proprietary FLYTE management system, its avoidance technology, and communications platform. During the flights, DDC's Mission Control Centre in Toronto, 2,500 km away, successfully monitored and record telemetry in real time for each flight.



### **Robin X1400**

[In August 2018](#), Transport Canada granted TAKOF a SFOC (special flight operations certificate) approving the company to commence testing of its Robin X1400 cargo delivery drone in Canadian skies. The Robin X1400 is fully integrated with Drone Delivery's proprietary Flyte management system and is capable of both larger payloads and greater flight ranges, of up to 60 kilometers.

Robin X1400 will utilize a state-of-the-art dual payload deployment system, which would allow both static and tethered cargo deployments. TAKOF believes the tethered deployment system is the future for delivery in urban settings. With the tethered solution, the drone never lands. It simply deploys its payload by tether while hovering above at a height of approximately 100 feet in the air.

### **The Falcon**

TAKOF is leaping ahead of any competition with a new long range and heavy payload drone called 'The Falcon' with a lifting capability of 50 pounds of payload and a travel range of 60km. TAKOF [announced on January 30<sup>th</sup> 2019](#) that it has commenced test flights in Southern Ontario that have been approved by Transport Canada.

The Falcon has a wing span of approximately 12 feet and is anticipated to travel 60 km at a speed of 50 km/hr. The multi-package payload compartment is designed to carry approximately 5 cubic feet of cargo and will be weather resistant.

*"In response to market demand driven by the burgeoning e-commerce industry, our engineering team was given the task of building out our fleet of cargo drones to address the need for a multi-package payload compartment solution which is applicable in many different geographies. The Falcon is the newest edition to DDC's fleet and meets this particular niche which is being requested by DDC's customers."*, commented Tony Di Benedetto, CEO.

## The Condor

[TAKOF announced](#) their Condor on February 19<sup>th</sup> this year. It has a payload capacity of 180 kilograms or 400 pounds, and a potential travel distance of up to 200 kilometers. The Condor pushes the limits in both cargo capacity and distances that is powered by a next generation gas propulsion engine.

The Condor measures 22 feet long, 5.1 feet wide and seven feet tall. It has a wing span of approximately 20 feet and is capable of vertical take off and landing. It is equipped with DDC's proprietary FLYTE management system which is the same platform used in all of DDC's cargo delivery drones. This is also the same management system that was used in the fall of 2018, during the company's operations in Moosonee and Moose Factory, Ontario in support of Transport Canada's Beyond Visual Line-of-Sight (BVLOS) pilot project.

DDC will be working closely with Transport Canada to secure the necessary approvals to begin flight testing the Condor in Q3 of 2019.



[On December 5, 2018](#), TAKOF executed a commercial agreement with the Moose Cree First Nation to deploy their drone delivery technology platform with the Moose Cree First Nation communities of Moose Factory and Moosonee, Ontario approximately 19 kilometers south of James Bay.

TAKOF is permitted to commercially operate its drone delivery platform with its Compliant Special Flight Operations Certificate (SFOC) which permits DDC to conduct drone operations in all Canadian provinces and territories. TAKOF will start with their Sparrow drone, capable of a 5 kg payload to transport goods between the communities that will include, letters, general parcels, medical supplies, and other general necessities.

Financial terms of the agreement were C\$2.5 Million for year one with the potential to expand services in following years. TAKOF expects that revenues will begin to be received late in Q2, 2019 once Federal funding is received by the Moose Cree First Nations. There are approximately one thousand remote communities in Canada, and, almost all face similar infrastructure and logistics challenges that contribute to a high cost of living. If TAKOF captures 10% of this market, it could equate to C\$250 million in annual revenue.

*"We have worked closely with DDC for nearly two years and see the many benefits of DDC's Drone Delivery Technology to our community as well as many others like us. Where infrastructure is weak, or at times non-existent or accessible, DDC's drone delivery platform is a valuable solution to connect remote communities and provide fast and efficient deliveries that were once not possible",* commented Stan Kapashesit, Director of Economic Development Moose Cree First Nation.

In many cases you can relate drone delivery to infrastructure. It can be far more efficient and cheaper than building bridges, roads, rail and commercial air deliveries. The Remote Communities market is only one segment of the overall total addressable market in Canada, but I see it as a logical place to start with drone deliveries in Canada and the remote areas of other countries.

In addition to Canada, TAKOF is working with other customers around the globe to license their FLYTE software and drone delivery technology. For example, [TAKOF is collaborating](#) with Toyota Tsusho Canada (trading affiliate of the Toyota group of companies). Collectively, the two groups will look to commence flight testing and identify other international markets to deploy TAKOF's proprietary drone delivery platform as a transportation solution.

*"This agreement with TTCL is expected to open international markets for us as a company,"* commented Tony Di Benedetto, chief executive officer of Drone Delivery Canada. *"Working alongside a global industrial leader such as Toyota Tsusho also provides us quick access to a very extensive international global network and a breadth of commercial skills."*

I recently met with TAKOF and asked CEO Tony Di Benedetto what puts them ahead of the competition and those coming up the ranks? *"Ron, we have developed a very unique solution which has been actively tested for a number of years, successfully executing thousands of flights. We are starting commercial operations this year, and 2019 is the year we move out of the lab and into the sky. We have signed commercial agreements with customers. Our capabilities now extend to 400lbs cargo capacity and flight distances in the hundreds of km's."*

TAKOF just completed a C\$10.02 million over subscribed financing at \$1.20 per unit. The stock is currently trading below this price and the lowest level it has seen since the company got started in 2017. I believe it is excellent timing to take a position.



For Amazon and Google, drone delivery is not a material part of their business so they do not divulge as much public information like TAKOF must do. That said, **Alphabet Inc. (GOOGL)** has also been advancing dramatically with their drone delivery solution and looks to be a major player in the field. This is some of what I could dig up on them.

[Project Wing](#) is an autonomous delivery drone service aiming to increase access to goods, reduce traffic congestion in cities, and help ease the CO2 emissions attributable to the transportation of goods. Wing is also developing an unmanned traffic management platform that will allow unmanned aircraft to navigate around other drones, manned aircraft, and other obstacles like trees, buildings and power lines. Light energy-efficient design enables the drones to fly up to 20 km/h, driven entirely by an all-electric power system with zero carbon emissions. The most recent drones can carry up to 5 pounds.

Wing completed their first real-world deliveries in 2014 in rural Queensland, Australia where they successfully transported a first-aid kit, candy bars, dog treats, and water to farmers. Then in September 2016, the team delivered burritos to students at [Virginia Tech](#) in what was, at the time, the largest and longest drone delivery test on U.S. Soil. Since 2014, Project Wing has flown tens of thousands of flights and they have been refining their aircraft design and communications tools.

Wing has started with a similar approach as TAKOF, focusing at first in rural areas of Australia. Most recently, they've completed hundreds of deliveries to the yards of several homes in the Australian Capital Territory and Queanbeyan regions of Australia. The goal is to determine how to find the best route to a home and how to find a safe delivery spot in the yard. The Wing team is also learning how drone delivery might be useful in people's everyday lives by transporting meals, groceries, medicine, and even spare car parts in the event of a breakdown.

Wing's UTM platform is designed to support the growing drone industry by enabling a high volume of drones to share the skies and fly safely over people, around terrain and buildings, and near airports. Wing is working with the Federal Aviation Administration (FAA) on the Low Altitude Authorization and Notification Capability (LAANC) system in the United States and with the Civil Aviation Safety Authority (CASA) in Australia to develop federated, industry-led solutions to safely integrate and manage drones in low-altitude airspace. Last May, the U.S. Department of Transportation selected Wing as **one of ten teams** to push the limits of drone technology in the **Unmanned Aircraft Systems Integration Pilot Program**.

Wing will also go commercial this year with plans to launch its first European delivery [service in Finland](#) in the spring of 2019. Wing plans to start with a small service trial in the Helsinki area and hopes to expand as time progresses. The drones are quite small and can only carry 1.5 kilograms with a round trip range of 20 kilometers. More detail can be found at [www.wing.com](http://www.wing.com).



## Conclusion

We are not going to see 100s of drones in cities delivering pizza and Amazon parcels for many many years. Amazon is dreaming or perhaps their strategy is to build a drone patent portfolio. Drone companies will have to establish a safety track record of 10s of thousands of flights or more before aviation authorities will consider deliveries in densely populated areas.

Drone delivery will be a heavy regulated industry like all of aviation. What most investors do not realize is that early movers such as TAKOF and Wing are going to establish drone flyways where they have exclusive rights for their drones on those flight paths. That is going to add considerable value to these companies, like owning freight railways in the sky.

On a commercial basis It is ironic, because thousands of Amazon parcels will be delivered by drones from companies like TAKOF and Wing, long before Amazon delivers their first one. Amazon and Google are not a very good play for investors to gain leverage to the disruptive drone technology where a company like TAKOF provides great exposure here.

I expect TAKOF will be bought out by another major company in the delivery business, like a FedX, UPS, Amazon or Air Canada Cargo to name a few. Alphabet could eventually spin out Wing with an IPO.

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